Computer Courseware Evaluations

January, 1983 to May, 1985

Curriculum

Alberta

COMPUTER COURSEWARE EVALUATIONS

A Series of Reports
Compiled by The Clearinghouse
Curriculum Branch
Alberta Education
January 1983 to May 1985

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ALBERTA EDUCATION'S COURSEWARE EVALUATION PROCESS

Alberta Education has set up a three stage process for the evaluation of computer courseware. Materials are first screened and, if found appropriate, the courseware is then evaluated independently by three teachers who have been trained and tested in evaluation techniques and in the use of the evaluation instrument developed by Alberta Education. Their three second stage reports are synthesized and successful materials advance to the final stage. In that third stage, the courseware is assessed by Alberta Education's Program Development Division which makes a decision on its status. Three designations are used:

BASIC LEARNING RESOURCES are those learning resources authorized by the Minister as being the most appropriate for meeting the majority of goals and objectives for courses, or for substantial components of courses, outlined in provincial Programs of Study.

RECOMMENDED LEARNING RESOURCES are those learning resources authorized by Alberta Education as they complement Basic learning resources by making an important contribution to one or more of the major goals of courses outlined in the Program of Study.

SUPPLEMENTARY LEARNING RESOURCES are those learning resources authorized by Alberta Education to support courses of study by reinforcing or enriching the learning experience.

Materials which are designated as "Basic" or "Recommended" are acquired by the School Book Branch for sale to the schools. "Supplementary" materials are not sold through the School Book Branch but purchase information is provided to the schools.

The Supplementary Learning Resources listed in this publication have not necessarily been subjected to the same rigorous evaluation as the "Basic" or "Recommended" materials. They have been identified on the basis of evaluations by teachers and Alberta Education officials as described above, but may not have been evaluated by a curriculum committee.

Clearinghouse reports are distributed free to school jurisdictions in Alberta. To facilitate circulation of the information within schools, two copies of the report have been sent to each Alberta school principal. A copy also has been sent to each superintendent. Alberta schools/school districts may make further copies as required or may purchase additional reports from the School Book Branch. Please use the tear-out form at the back of the book. Jurisdictions outside of Alberta may purchase copies of this 1985 report from the School Book Branch. In addition, they may use the form at the back of the report to order the 1986 publication.

USE OF THIS BOOK

As indicated on the previous page, Alberta Education authorizes learning resources at a "Basic", "Recommended" or "Supplementary" level. It is important for readers to note, particularly those from outside of Alberta, that a major factor in the differentiation between these three levels is the amount of the Alberta curriculum that the product covers. Thus one product may have a 'lower' status than another but this may be due entirely to the relatively limited scope of the Alberta curriculum that it supports. All of the products described and evaluated on the green pages have reasonable quality.

Furthermore, the designations used by Alberta Education are not equivalent to numerical scales or to summary phrases commonly in use by other evaluation agencies. We have deliberately avoided summarizing products with a single phrase or a numerical total as readers may place undue emphasis on such summaries which by their nature are incomplete and potentially misleading. The courseware products described in this report all have varying strengths and weaknesses, they have different objectives and different pedagogical strategies designed to achieve these objectives. To get a full appreciation of the product's quality, the full report must be read.

Code numbers from 40 to 43 are used on lists in this document to identify products that we are unable to recommend. These numbers refer to the stage at which the product was found to be unsatisfactory. Products identified with a '40' were found to be unsatisfactory either through evaluation reports by other credible agencies or through our own evaluation of similar materials in the company's product line. Products identified with a '41', '42' or '43' were found to be unsatisfactory in our first, second and third stages of evaluation respectively.

Readers will note that this document includes no assessments of MECC products. As MECC viewing centers have been set up throughout the province, and as MECC products are available to Alberta schools at a cost of $8.00 per disk, we have concentrated our limited resources on evaluating products which are less accessible to Alberta schools. Inquiries about the quality of MECC products may be directed to Albert Education Regional Offices.

Readers from outside of Alberta are advised that our evaluative criteria have been based on fairly high expectations and on the Alberta curriculum. As curricula and expectations will vary, materials rejected for Alberta schools should not automatically be disregarded by other educational institutions. Also, please note that Alberta Education subsidizes the purchase of courseware materials by the School Book Branch. As such, S.B.B. prices noted in this report apply to Alberta schools only.

IMPORTANT NOTE: FORMAT OF THIS REPORT

This report is the fourth issued by Alberta Education's Clearinghouse. It contains cumulative, updated information on microcomputer courseware products authorized by Alberta Education from January, 1983 through to May, 1985 (green pages). In addition, information on products which have been favorably assessed through two of our evaluation stages but which are still under final review are provided on yellow pages. Products which are described on these yellow pages have been favourably reviewed by trained teacher evaluators only and HAVE NOT BEEN AUTHORIZED BY THE DEPARTMENT OF EDUCATION. Some may become authorized and some of those may, as a result, become available through the School Book Branch at reduced prices. On the other hand, some may fail the Department's final evaluation and will not be authorized.

With the rapid increase in the number of computers in the schools and with the resultant urgent need for high quality courseware materials, school jurisdictions have expressed a need to receive current information on courseware more quickly. However, Alberta Education's formal evaluation process is by necessity detailed and time consuming. The second stage reports on the yellow pages have been included in this report to help meet the needs of school jurisdictions but educators should note that they are preliminary in nature only. Making any purchase initiatives based on the information in these reports may result in some time savings; however, it may also result in the acquisition of materials which are not authorized or the acquisition of materials at a price higher than may be available through the School Book Branch. The responsibility for such decisions rests with the jurisdiction. Alberta Education has included these preliminary reports only as a service to the schools and no authorization status has been given or implied. Jurisdictions contemplating extensive purchases may wish to contact the Clearinghouse for current information on the status of products on the yellow pages.

Updated information on the authorization/non authorization of products on the yellow pages will be issued to schools through the Department's publication "Education Today". The next formal Clearinghouse report is planned for May/June 1986.

DUE TO THE INCREASED NUMBERS OF AUTHORIZED PRODUCTS AND THE INCREASED COSTS OF PRODUCING THIS ANNUAL REPORT, READERS ARE ADVISED THAT WE MAY NO LONGER BE ABLE TO MAINTAIN ITS CUMULATIVE NATURE. OVER THE NEXT YEAR WE WILL BE EXAMINING OTHER FORMATS AND OTHER COMMUNICATION VEHICLES AND IT IS POSSIBLE THAT THE 1986 REPORT WILL BE LIMITED TO INFORMATION ON PRODUCTS EVALUATED IN THE PREVIOUS YEAR ONLY. AS SUCH, THE 1985 REPORT'S USEFULNESS MAY EXTEND BEYOND A PERIOD OF ONE YEAR. JURISDICTIONS MAY WISH TO ORDER ADDITIONAL COPIES FOR REFERENCE PURPOSES - SEE THE LAST PAGE IN THE REPORT FOR ORDERING INFORMATION.

ADDITIONAL FEATURES IN THE 1985 REPORT

Readers familiar with our reports will notice a number of added features.

1. We have added a section called "Early Childhood" in order to better identify those products which may be appropriate for very young students (ages < 6). The Early Childhood Branch of Alberta Education is in the process of setting up procedures whereby learning resources for this target audience can be authorized and it is anticipated that such formal authorizations will be available in our 1986 report. TO DATE HOWEVER, NO SUCH APPROVALS CAN BE GIVEN. In the interim, we have identified potentially useful materials for pre-grade 1 students and have listed them in the index to the section called "Early Childhood". Teachers interested in these products should read the full evaluation reports which are located in the curriculum area (e.g. Math, Language Arts) for which the product was authorized for Grade 1+ students. The index to the section gives the appropriate page numbers.

Also included in this section is a list of products which we are unable to recommend to Early Childhood teachers.

2. We have also added a section titled "Problem Solving". A number of courseware producers are developing programs which attempt to develop problem solving skills that are independent of a particular subject area. As such, they do not fall specifically within one particular subject but could indeed be appropriate for several subjects. In order to faciliate the identification of such programs, we have listed them in the section titled "Problem Solving" and have provided abstracts of the products. Teachers interested in these products should read the full evaluation reports which are located in the curriculum area (e.g. Math, Science) for which the product was authorized. Also included in this section is a list of problem solving products which we are unable to recommend.

3. References are now included to a number of IBM courseware products. In a gradual expansion of our coverage, we are examining the IBM versions of authorized Apple products and, where available and where appropriate, these versions will be authorized. Reference to any such authorization is made in two places in the product evaluation. Under "System Requirements" (beginning of the report), we have identified the Apple and IBM requirements and under "Status" (end of the report), we have noted that both versions are authorized. Please note that our coverage expansion has just started and some IBM versions of previously authorized products have not yet been acquired.

4. Included within the description section is cataloguing information for Alberta school librarians. This has been provided by the Albera Education Library Services Branch and is titled "Alberta Education Call No.". Pleae note that this is provided for authorized products only and not for products still in the final evaluation stage.

ACQUIRING PRODUCTS LISTED IN THIS DOCUMENT

Sources of products listed in this document are given at the end of each evaluation report. The following information is provided to clarify Alberta Education's present role in such acquisitions.

Products which are identified as "Basic" or "Recommended" learning resources are acquired and provided at discounted prices through the School Book Branch. This is a branch of the Department of Education and such discounts are available to Alberta schools only. The School Book Branch issues an annual catalog of products (text as well as microcomputer) and schools should order materials using the required forms. The S.B.B. also handles warranties and returns for microcomputer products. Please note that principals/purchasing officers are required to certify that the microcomputer products being purchased are for use by the school and the product's copyright will be protected.

The majority of authorized microcomputer products falls within the category of "Supplementary" learning resources. While, schools can purchase such products through the School Book Branch special order process, the S.B.B. does not stock them and, as such, delivery time lines may be lengthy. At this time, schools will likely find that the purchase of "Supplementary" microcomputer materials will be concluded more economically and efficiently through private companies specializing in such sales. Information on the source of the product is given at the beginning and end of each product assessment.

While other software companies and computer dealers may sell courseware, the following Alberta companies have drawn their educational courseware product line to our attention. Please note that we have included such availability on the basis of the companies' most recent product catalog; however, these do not remain static for long and our information may become dated quickly. As prices and the composition of a product line will vary, schools are advised to acquire such information from the following companies directly.

Alphatel Computer Products,
11428 - 168 Street,
Edmonton, Alberta, T5M 3T9
(403) 452-0025

Edupro Software
P.O. Box 1216
Edmonton, Alberta, T5J 2M4
(403) 458-0303

Roxcel
Box 37, 4192 - 93 Street
Edmonton, Alberta, T5J 2G9
(403) 462-0741

SUBJECT AREA INDEXES

Subject	Page
BUSINESS EDUCATION/APPLICATIONS	Bus 1
COMPUTER LITERACY/SCIENCE	Comp 1
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BUSINESS EDUCATION/APPLICATIONS INDEX (SENIOR HIGH)

AUTHORIZED

TITLE	PUBLISHER	STATUS	PAGE
Alphabetic Keyboarding	Southwestern Publishing	Recommended (Keyboarding modules)	Bus 3
Apple Writer IIe	Apple Computer Inc.	Recommended (Bus. Ed. 10/20/30)	Bus 5
Automated Accounting for the Microcomputer	Southwestern Publishing	Supplementary (Acct. 10)	Bus 7
Bank Street Writer (48K Version)	Scholastic	Recommended (Bus. Ed. 10/20/30)	Bus 9
Bank Street Writer (64K/128K Version)	Scholastic	Recommended (Bus. Ed. 10/20/30)	Bus 13
Enterprise Sandwich Shop	McGraw Hill Ryerson	Recommended (Basic Bus. & Mark. 20/30)	Bus 17
Format II (Enhanced)	Kensington Software	Recommended (Bus. Ed. 10/20/30)	Bus 19
Free Enterprise	Science Research Associates	Recommended (Basic Bus. & Mark. 20/30)	Bus 23
Gregg Keyboarding for Information Processing	McGraw Hill Ryerson	Supplementary (Keyboarding Modules)	Bus 25
Microcomputer Keyboarding	Southwestern Publishing	Recommended (Keyboarding Modules)	Bus 27
Microcomputer Oriented Accounting	Southwestern Publishing	Supplementary (Acct. 10)	Bus 29
Screen Writer II	Sierra	Recommended (Bus. Ed. 10/20/30)	Bus 31
Simulated Computer	Edusoft	Supplementary (Computer Processing)	Bus 35
Touchtype	Software Spirit	Recommended (Bus. Ed. 10/20/30)	Bus 37
Typing Tutor II	Microsoft Consumer Products	Supplementary (Keyboarding Modules)	Bus 39
Visicalc (Upgraded Version)	Software Arts	Recommended (Bus. Ed. 10/20/30)	Bus 41

NOTE:
Titles listed above have been authorized for use in Senior High Business Education courses; however, they may have some applicability outside of this area. The evaluation reports will give the reader an indication of the target audience that was intended by the producer.

UNDER THIRD STAGE REVIEW

The Whatsit Corporation	Sunburst Communications	Still Under Review	Bus 43

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

Bus 45

ALPHABETIC KEYBOARDING

DESCRIPTION

Title: Alphabetic Keyboarding
Author(s): Truman Jackson, Dennis Schroeder & John Haugo
Publisher: Southwestern Publishing
Source: c/o Gage Publishing, 164 Commander Blvd, Agincourt, Ontario M1S 3C7
Subject: Business Education
Topics: Keyboarding skills
Components: 2 Disks with backups
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor; shift key modification for II+
IBM PC family, 64K, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model III/IV
Alberta Education Call No.: Z 49 A456 1983

Version: 1983
Display Language: English
Cost: $127.10 (1984)
Tel. #: (416) 293-8141
Users: Not Specified

OBJECTIVES

This program is designed to introduce students to touch typing of the alphabetic keyboard, develop reasonable speed & accuracy and teach proper typing keyboarding techniques.

PEDAGOGICAL CONTENT DESCRIPTION

The 18 lessons on the two disks in this program introduce students to the microcomputer keyboard location and the proper touch typing technique for each alphabetic letter, the punctuation keys, and the right and left shift keys. Each lesson offers goals, conditioning practice, technique explanation and a variety of practice routines.

These two disks are the introductory disks to the four-disk program "Microcomputer Keyboarding", also authorized for use in Alberta schools - see its evaluation elsewhere in this report (BusEd pages).

PEDAGOGICAL CONTENT EVALUATION

When completed in their entirety, these eighteen lessons offer complete, independent instruction in the correct operation of the alphabetic keyboard. Sequencing is excellent with three new keys being introduced with each lesson and every third lesson acting as a review. Since content is designed to be used either on a microcomputer or an electric typewriter, function keys specific to the microcomputer keyboard are not addressed. It should also be noted that instruction is limited to the alpha-numeric keyboard-- no disk instruction is given on the number or symbol keys. Since students can choose to repeat any drill, sufficient depth of instruction is available.

INSTRUCTIONAL FORMAT DESCRIPTION

Students select lessons from a main menu. Within each lesson, instruction is given in the location and operation of new keys and the student is then given practice in typing individual alphabetic characters, letter combinations, words, sentences and paragraphs. If an error is made, the keyboard is locked, a beep is heard, the correct key is flashed on the screen keyboard display and the program waits for the correct key to be struck.

The emphasis in the first fifteen lessons is on accuracy; however, the last three lesssons on the disk contain drills for improving keystroking speed, paragraph speed and response speed.

INSTRUCTIONAL FORMAT EVALUATION

Disk instruction is well organized by lessons, with sub-categories within lessons easily assessible from a menu. Textual instructions are clear and concise with graphics advantageously used to clarify and illustrate typing technique and keyboard locations. The student has control of sequence; however, a beginning typist is well advised to heed the on-screen advice and complete each lesson in order, as succeeding lessons build on previously introduced concepts. While the amount of practice material is program controlled, students do have the opportunity of repeating any exercise an unlimited number of times.

Feedback is immediate and takes one of two forms: in the lessons where new keys are being introduced, a beep sounds and the program will not proceed until the correct letter has been entered; in speed and accuracy building lessons, the student is presented with a gross w.p.m. immediately upon completion of each specified exercise. (Note: The emphasis in the alphabetic introduction lessons is totally on accuracy while the emphasis in the review and practice sessions is totally on speed, measured in G.W.P.M. only. When working on skill improvement, students could thus be making a unlimited number of errors; however, this would be unlikely if they had carefully completed the initial lessons with their strong accuracy emphasis.) The program takes full advantage of the computer's ability to set speed goals based upon the student's previous performance and thus proves very motivational. Frequent posture and technique reminders are also introduced throughout the lessons, although teacher supervision would still be necessary to ensure that students were heeding this advice.

TECHNICAL DESIGN DESCRIPTION

High res graphics are used to illustrate the keyboard, correct posture, and proper finger positioning/movement. Sound is used to draw attention to errors. Text is presented in combination upper/lower case with bold facing and enlarged text for emphasis.

TECHNICAL DESIGN EVALUATION

This program makes excellent use of the computer's hi-res graphics generation ability to illustrate keyboard locations (via flashing letters) and to demonstrate proper typing technique. Text is appropriately displayed in combination upper/lower case and is well-spaced on the screen. Being totally menu driven, the disks are easy to use.

A shift key modification is ESSENTIAL for use of this program with an Apple II+. This is not clearly identified in the documentation.

SUMMARY STATEMENT

This program offers well organized lessons and utilizes excellent high resolution graphics to illustrate proper technique. It would be an effective tool for independent learning of touch typing or a useful program for reviewing and sharpening keyboarding skills. The program is fairly expensive and this is compounded by the fact that frequent disk interaction limits use of the program to one computer at a time.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. In reviewing the IBM version, three notable differences were found.

1. The Apple product has a 40 column large size character display and the IBM version has an 80 column standard size character display. While both packages contain similar drill material, the IBM version presents longer sentences per frame.

2. The Apple product utilizes high resolution graphics and the IBM version has low resolution graphics. While the keyboard is more clearly depicted in the IBM version, motion movements involving finger movement, wrist position, operation of the return key, etc. are much clearer on the Apple's high resolution screen.

3. The IBM product depicts proper seating position at the keyboard - the Apple version does not.

Minor differences in organization of content are apparent but these are not significant. In sum, the IBM version is at least equivalent to the Apple version.

STATUS

The Apple and IBM versions of "Alphabetic Keyboarding" have been designated as RECOMMENDED learning resources for keyboarding modules.

PURCHASE INFORMATION

Alberta schools may purchase either version of this product from the School Book Branch for approximately $105 (Apple version, 1985). Defective diskettes will be replaced without charge within a 90 day warranty period. Note that the package contains backup diskettes. There is no warranty for diskettes which become inoperable through normal usage.

Note that this package is a portion of a more comprehensive product produced by Gage/Southwestern and being sold by the School Book Branch. See the evaluation of "Microcomputer Keyboarding" elsewhere in this document (BusEd section).

As disk interaction is frequent, the product may be used with only one computer at a time.

APPLE WRITER IIE

DESCRIPTION

Title: Apple Writer IIe
Author: Paul Lutus
Publisher: Apple Computer Inc.
Source: 20525 Mariani Avenue, Cupertino, CA 95014
Subject Business Education/Applications
Components: 1 disk, 1 backup, user's manual (208 p.)
System Requirements: Apple IIe/IIc only, 64K, 1 disk drive, monochrome monitor, printer
Optional Hardware/Software: 2nd disk drive, 80 column card
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: HF 5548.115 L974 1982

Version: 1982
Display Language: English
Cost: $195 U.S. (1983)
Tel. #: (408) 996-1010
Users : High school +
Screen Display: 40 or 80 column

EDITOR DESCRIPTION

The user is put into entry mode immediately upon booting. Document length is restricted only by disk capacity. File names can be up to 30 characters long but may not contain symbol or punctuation marks. Editing can be done in the same mode with the arrow keys used to control cursor movement and the delete key for destructive backspacing. A beep draws attention to errors and screen prompts indicate the nature of the error. Commands are largely mnemonic (e.g. CONTROL F for "Find", CONTROL S for "Save", etc.). Scrolling is achieved with the arrow keys or, for faster movements, with the closed apple key and the arrows. The movement of blocks of text is limited to 1024 characters; however, the user is given the choice of removing the text from one location and placing it somewhere else or copying the text and moving the copy to another location. CONTROL Y enables the screen to be split horizontally into two 12 line displays to facilitate text movement. The "find" and "replace" commands work manually or automatically and wild cards can also be used within these functions.

EDITOR EVALUATION

The process of document creation is straightforward and relatively easy to learn. Cursor movement is easily accomplished via the arrow keys and CONTROL B or CONTROL E can take the user directly to the beginning or end of a file. Text movement is easily accomplished once the process is learned and the buffer capacity is adequate, although long passages may have to be moved in several steps. The search and replace feature is efficient.

Error messages tend to be too general to be of any real help to the user (e.g. "Syntax Error"). This can be especially confusing when the program rejects an entry but it is left to the user to figure out why. For example, a file name containing a symbol will not be saved to disk, but the error message does not specifically tell you why the save process is not working. Careful reading of the documentation is necessary.

FILE MANAGEMENT DESCRIPTION

Documents can be saved with two keystrokes, file names can be in either upper or lower case and parts of a file can be saved via delimiters. The Apple Writer IIe master does not allow an entire data disk to be copied; however, this can be accomplished with the Systems Master Copy A program. Built-in safeguards protect against accidental deletion of files and files can be locked if desired. The program will interface with selected software and has the inherent ability to convert Apple Writer 1.1 files to IIe files. No password security is available.

FILE MANAGEMENT EVALUATION

The process of storing or deleting documents is easy and efficient and a catalog check enables the user to verify that the requested action has taken place. Loading a file is easily done; however, the user must remember to clear the memory before loading or one file will be appended to another. This feature allows longer documents to be created from separate smaller documents on the disk. Since files are saved in standard text form, interfacing with other compatible software programs is available. The lack of a password is not a serious weakness.

PRINT FORMATTER DESCRIPTION

Built-in default values for margins, line spacing, page intervals, etc. can be user-altered. Variable margins within a document can be created with embedded commands. Built-in tabulations can be overridden and settings can be visually seen on the data line; however, tabulations beyond an eighty space line are not possible. Positive and/or negative indentions can be accommodated. Automatic centering can be accomplished between margins only. Apple Writer IIe allows single, double or triple spacing but does not offer half spacing. Left, right, fill or center justification is available. The program will automatically paginate and can print headers or footers. Word wrap is automatically invoked upon booting but it can be disabled. The screen display closely approximates the printed page but some commands (e.g. underlining) are still shown in embedded form. The data line, once understood, provides current information re. upper/lower case, presence/absence of word wrap, memory capacity, document length, tab position and file verification. The program has the inherent ability to print a glossary containing a maximum of 99 definitions, with a total character count of 128 per definition. A word processing language is provided which enables the creation of form letters, address labels, linking and successive printing of documents, etc.

The program offers print options including the ability to print parts of a document, spooling, aborting, and accommodating fanfold or single sheet paper feed.

PRINT FORMATTER EVALUATION

Built-in default values can be easily overridden and new values can be stored. Tabulation sets are visible on the data line; however, the fact that tabs cannot be set past an eighty character line even though most printers will accommodate a 132 character line may prove to be a slight limitation. The provision for both positive and negative indentations is an excellent feature. Centering is limited to between margins only; there is no provision for decimal alignment or multi-column centering. The absence of half spacing means that the program will not accommodate sub or super scripts. Print options are excellent but the explanation of printing procedures provided in the manual is weak. Evaluators experienced some problems with the pagination feature--it appeared to work correctly on the second print, but embedded commands were often overlooked on the first run.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The user's guide provides an explanation of each of Apple Writer IIe's commands.

IMPLEMENTATIONAL SUPPORT EVALUATION

While the documentation does address all of Apple Writer IIe's features, it lacks sample tutorial problems which are invaluable in providing hands-on experience. Documentation strength could be improved by including an initial "easy start-up" section which would introduce the rudimentary commands necessary to basic operation. In its current form, all commands are introduced in sequence, resulting in an overwhelming number of commands for uninitiated users. Greater depth of explanation supplemented by pictures and illustrations would aid the clarity of the manual. While the documentation does contain a comprehensive index, the inclusion of a trouble shooting document and a quick command reference card would be advantageous.

EASE OF USE EVALUATION

The program is easy to use once trial runs have been made of each operation. A command summary help screen is available at all times. The fact that the program loads completely upon initial booting is a positive feature.

SUMMATION

Apple Writer IIe is a powerful word processing program suitable for use by advanced business classes; however, users must be prepared to invest considerable time initially learning to operate the program. Since commands are not visually available on screen nor are they summarized on a reference card, users must be prepared to memorize them or consult the documentation frequently. Apple Writer IIe tends to be costly in comparison with other word processing programs of similar power.

STATUS

"Apple Writer IIe" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch; however, no pricing or warranty information was available at time of printing. Please note the non-subsidized price at the beginning of the report. Schools should contact the S.B.B. for the price to Alberta schools.

The diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license/purchase agreement.

AUTOMATED ACCOUNTING

DESCRIPTION

Title: Automated Accounting for the Microcomputer
Authors: Warren W. Allen & Dale H. Klooster
Publisher: Southwestern Publishing
Source: c/o Gage Publishing, 164 Commander Blvd., Agincourt, ON M1S 3C7
Subject: Business Education
Topics: General ledger, accounts payable, accounts receivable, payroll
Components: 1 diskette, student workbook (348p.), teacher's manual (138p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, student workbook, printer (optional).
IBM PC family, 64K, monochrome monitor, student workbook printer (optional).
Other Formats Available (not evaluated): TRS-80 Model I/III/IV, Monroe
Alberta Education Call No.: HF 5679 A432 1982

Version: 1982
Display Language: English
Cost: See below
Tel. #: (416) 293-8141
Users : High School

OBJECTIVES

The stated objectives of this program are to teach automated accounting principles in such a way that no prior knowledge of computers or computerized accounting is required and to provide the student with confidence in the use and understanding of a hands-on automated accounting system.

PEDAGOGICAL CONTENT DESCRIPTION

This utility diskette offers integrated computerized accounting of General Ledger, Accounts Payable, Accounts Receivable and Payroll. Within each of these four areas, available options include: creating a file, setting run time, maintaining a file, entering transactions, printing reports or returning to main menu.

When used in conjunction with the student workbook, progression is structured. It begins with an overview of computerized accounting (Chap. 1), then presents General Ledger in detail (Chap. 2-4) , progresses to Accounts Payable (Chap. 5-6) and Accounts Receivable (Chap. 7-8) and terminates with Payroll (Chap. 9-10). Each workbook chapter follows a 3-step process: principles are introduced and illustrated, students work through a sample program, and exercises built upon the sample program are presented.

PEDAGOGICAL CONTENT EVALUATION

This diskette, when used in conjuction with the workbook, offers a close correlation with modules 1-4 of the new Business Education Accounting curriculum. Information is clearly presented in tutorial format and sequencing is appropriate. Principles are introduced individually, interrelationships are effectively presented via detailed system flowcharts (which also guide the user in selecting appropriate courses of action), and projects at the end of each cycle reinforce understanding. Liberal use of well-illustrated examples combined with user disk interaction and subsequent step-by-step guided individual application exercises result in appropriate depth of coverage to meet the stated objectives. All terms are clearly defined at the beginning of each chapter.

Concerns about the content include the fact that worksheets are totally omitted (although adjustments and closing entries are discussed), the payroll section is U.S. formatted and therefore of little value to Canadian users, and the documentation lacks an index or glossary.

INSTRUCTIONAL FORMAT DESCRIPTION

Students access systems within the program by single key selections of options presented in main or sub-menus. Thereafter, alphanumeric entries (guided by on-screen prompts) are required. After data entry, all affected accounts are automatically updated and files are automatically saved when the program is formally terminated. Rate is determined by speed of data entry and system processing speed (which slows with increased amounts of data).

Each data entry screen has a standard display. The fourth line is used to flash system status messages (awaiting reply, processing data, etc.). The bottom two lines are devoted to procedural error messages which are coded by number and referenced in the workbook. If the program is used with a printer interface, documents appear only in hard copy form.

While no formal tests are provided, there is on-going evaluation in that proof entries are provided after each input and all documents are expected to balance. Out-of-balance messages together with the numerical differences are presented for each report. Success is dependent upon complete and accurate entry of all data . Final evaluation rests with the instructor (a teacher's guide complete with answer keys for all exercises is available).

INSTRUCTIONAL FORMAT EVALUATION

This courseware does an excellent job of organizing, calculating and printing accounting information and thus simulating an electronic accounting system. Instructions are explicit, student interaction is frequent and consistent, and feedback is immediate and clear. To fully appreciate this program however, students should have prior familiarization with manual accounting techniques.

Three concerns with instructional format exist: when interfaced with a printer, documents cannot be visually checked for accuracy on the screen prior to printing; the use of proofing documents may obsure the total view of integral accounting forms; and, individual T-accounts cannot be screen viewed or printed.

TECHNICAL CHARACTERISTICS DESCRIPTION

Neither color nor graphics are used; however, sound and inverse lettering are used to draw attention to procedural errors.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are appropriate, uncluttered, consistent with standard accounting procedure and easily interpreted. Speed of access is dependent upon the amount of information in the files but is generally satisfactory. Generation of print reports at the end of major projects can be time consuming, particularly since no keyboard entry is allowed while printing.

Four problems with technical design are noted:

1. The program does not acknowledge an Epson Parallel Interface Printer.
2. Control S has to be used to enable screen reading. This is not adequately explained in the documentation.
3. There is no provision for storing multiple data sets. Each student must have an individual copy of the program.
4. If the program is booted and left idle for 20 minutes or more, system error messages appear and no further keyboard entry is allowed. Since re-booting is necessary, all data previously entered are lost.

SUMMATION

This program is generally a good utility package which a student should be able to operate independently (provided it is used in conjunction with the workbook). It requires just one disk drive to operate and it provides a comprehensive overview of a computerized accounting process.

APPLE - IBM VERSIONS

This report has been based on an evaluation of the Apple version. However, in reviewing the IBM version, the only significant difference found was the menu item "Printer Specifications" in the Apple version which allows the user to configure for a variety of printers. The IBM version omits this menu choice but the product will still work with the IBM printer.

STATUS

The Apple and IBM versions of "Automated Accounting for the Microcomputer" have been designated as **SUPPLEMENTARY** learning resources for Acct. 10.

PURCHASE INFORMATION

This product may be purchased from Gage Publishing, 164 Commander Blvd, Agincourt, Ontario, M1S 3C7, (416) 293-8141.

A program diskette costs $68.60 (Apple, 1984), the student textbook/manual is $13.15 and the teacher's guide is $11.10. Each student must have his/her own program diskette. At the end of the course, that student's data can be erased from the diskette.

A "driver" diskette may be purchased for $108.85 (Apple, 1984) which will allow students to store data on their own diskettes. This allows more than one student to use the diskette during the term but the diskette can be used with only one computer at a time.

Defective diskettes will be replaced without charge within a 90 day warranty period. There is no warranty for diskettes which become inoperable through normal use.

BANK STREET WRITER (48K VERSION)

DESCRIPTION

Title: Bank Street Writer (48K Version)
Authors: Intentional Educations Inc., Franklin E. Smith & Bank Street College
Publisher: Scholastic Inc.
Source: 123 Newkirk Road, Richmond Hill, ON L4C 3G5
Subjects: Business Education/Applications, Language Arts, Computer Literacy
Components: 3 disks (2 originals, 1 back-up), 3-ring reference manual (104p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer recommended
Optional Hardware/Software: Shift key modification on Apple II+ suggested, 2nd disk drive
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: HF 5548.115 B218 1983

Version: 1982
Display Language: English
Cost: $125.00 (1984)
Tel. #: (416) 883-5300
Users : Elementary +
Screen Display: 38 column

NOTE

This report is on the version of Bank Street Writer originally designed for 48K Apple II+ machines. As this product is still available for sale, we have included its assessment in this collection. An evaluation of the enhanced version of Bank Street Writer (64K/128K Apple machines) follows this assessment.

EDITOR DESCRIPTION

"Bank Street Writer" has three modes of operation: write, edit and transfer. The mode of operation and the commands available within it are continually displayed on the top of the screen. Documents are created in WRITE mode, but changes are made via EDIT mode. The I, J, K and M keys control cursor movement and the --> or <-- keys are used to delete. The program will accommodate line by line scrolling, 12 line forward or backward jumps, or will move directly to the beginning or the end of a document. File length is limited to 1300 words on the Apple II+ and 3200 words on the Apple IIe. The screen displays 40 characters per line; the default printout displays a 65 character line. (Margins can be changed by accessing the utility program). Up to 15 lines of text can be moved at one time. The find/replace function will search forward in text for strings up to 29 characters in length and requests individual user response for each replacement.

Upper case letters are obtained using the shift key on the Apple IIe, but unless a lower case adapter is installed, Apple II+ users must use the dual combination of CONTROL and ^ to obtain capital letters.

EDITOR EVALUATION

Short, simple documents can be quickly and easily created using Bank Street Writer's ever-visible commands. Screen prompts are clear and offer step-by-step instruction. Sound is effectively used to draw attention to procedural errors and error messages are simple to understand and are appropriately corrective. Students may be initially confused by the transfer between WRITE mode and EDIT mode (to make changes) and by the dual use of the I, J, K and M keys (used as letters in WRITE mode; used to control cursor movement in EDIT mode). It is unfortunate that the program does not utilize the arrow keys and the delete key on the Apple IIe to control cursor movement.

The need to use two keys to achieve capital letters on the Apple II+ proves time consuming, but this weakness is not unique to Bank Street Writer--it is common to most word processing programs written for a 48K computer. Scrolling is adequate but page jumps cannot be accommodated. The use of reverse display to highlight text to be moved makes the process very clear; however, the restriction to 15 lines proves limiting and necessitates that large text moves must be broken down into several 15 line segments. The find/replace feature works in forward search only and unfortunately is not global in nature--each case must be individually reviewed. The deletion process proves time consuming since deletions are done by character only--there is no provision for deleting by word, line, sentence or paragraph.

FILE MANAGEMENT DESCRIPTION

File names can be no longer than eight characters in length. Either entire files or portions of files can be saved. A check question to guard against accidental deletion of files is built into each program. Although files cannot be locked, the user has the option of using a five letter password for additional security. Bank Street Writer files are stored in binary format but they can be transferred to text files for interface with the Applewriter II and IIe via the Bank Street Writer Utility Program. Data disks can be initialized directly from the Bank Street Writer master; however, copying an entire disk for backup purposes requires use of the Apple DOS COPYA program.

FILE MANAGEMENT EVALUATION

Documents can be easily stored and merged by following the self-explanatory screen prompts. Although the number of keystrokes involved in storing, copying or deleting a program is acceptable, the actual speed of operation would likely be considered inefficient for senior applications.

The user has the option of limiting access to files by choosing a password; however, this results in only a very limited measure of extra security as all passwords can be displayed via the utility program on the disk. (This may be an advantage for classroom use as students who forget their password have the opportunity of reviewing it). The restriction to 5 and 8 characters for a password and file name respectively may prove limiting, especially in high school business classes where students may be doing dozens of jobs in the same topic area.

Bank Street Writer's file management system generally proves very forgiving. For example, if a student asks for a clear or a delete, (s)he is given an opportunity to change his/her mind before the process is activated. Similarly, if a user inadvertently deletes material, (s)he can recover it (if the error is discovered immediately) by use of the "unerase" function.

The conversion process of changing binary to text files and vise versa is very slow.

PRINT FORMATTER DESCRIPTION

Built-in margins are set for 65 characters/line. Limited changes to the margins (a left hand margin ranging from 1 - 20 spaces) can be made via the utility program. Four built-in tabs are set at 8, 16, 24 and 32 (i.e. at quarter intervals on the screen display). Single, double or triple line spacing can be accommodated. There is no automatic way to indent the first sentence of each paragraph--this can only be done manually through use of the space bar. "Bank Street Writer" does employ word wrap (which cannot be disabled), but it does not right justify text. Centering ability is limited to automatic centering between margins. It can print either a one-line header which must occur on the same line as the page number. Page numbers may be placed in one of two positions: top center or bottom center.

The "Bank Street Writer" screen is divided into three sections: the top four lines display the commands, the middle 18 lines are used for text entry, and computer messages are displayed at the bottom. A display of available memory space can be obtained by hitting CONTROL S.

For ease in editing, the program will print a rough draft with a 38 character display conforming to the screen display or a final draft in the margins selected by the user. Portions of a file can be printed, the option of spooling is available, and printing can be aborted at any time by pressing ESC.

PRINT FORMATTER EVALUATION

Bank Street Writer's print formatter provides the basic necessities only. The limitations in margin settings, the lack of justification, the inability to accommodate super/subscripts, the lack of automatic paragraph indentions, the inability to hyphenate or to disable word wrap combine to limit the use of this program to very basic word processing operations only. Since centering can be accommodated betweeen margins only, newspaper column applications and the production of tables with headings are cumbersome if not impossible to do. Centering unfortunately is not visible on the screen; it occurs on the print copy only. Furthermore, the fact that the automatic tabulations are preset and indent the entire paragraph severely limit flexibility. There is no provision to set different tabs, to clear preset tabs, or to accommodate decimal alignment.

The inconsistency between screen display (40 character width) and print copy (up to 80 character width) may cause confusion. Print options are also somewhat limiting in that while it is possible to stop printing at any time, it is not possible to reactivate it from the same point--the entire document must be reprinted from the beginning.

The fact that this program does not have the ability to underline is a serious disadvantage. Its lack of bufferring ability (i.e. you cannot continue to keyboard entries while a program is printing) also limits its speed of operation.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The manual (in 3-ring binder format) is divided into five sections:

1. The 'Introduction' explains what a word processor is and how it operates.
2. The 'Reference Guide' provides a detailed description of Bank Street Writer and its utility programs.
3. The 'Student Guide' contains reproducible instruction sheets for student use.
4. The 'Question and Answer' section answers questions most frequently asked.
5. The 'Student Activities' provides sample exercises for classroom use.

In addition, the back side of the master disk contains a step-by-step tutorial program which covers all editing operations. Transfer or printing operations however are not addressed.

IMPLEMENTATIONAL SUPPORT EVALUATION

The documentation is easy to read and follow and will not be intimidating to novice computer users. Its pleasing layout, orderly arrangement, and use of lay language combine to make it very readable. The suggested student activities provide good sample exercises for learning this word processing program.

The tutorial program provided on the disk provides an excellent brief introduction to the operation of the program thus enabling students to independently use the program to produce short documents within the first hour.

EASE OF USE EVALUATION

"Bank Street Writer" is exceptionally easy to use and is ideally suited for use in elementary grades, although it would serve as an excellent introduction to word processing at any level. Within a half hour of operation, the user will be familiar with the three modes of operation (write, edit, and transfer) and will be able to create short documents. The high resolution graphics screen displays are uncluttered and attractive. The program proves very easy to learn and is very reliable in normal classroom use.

It has an additional advantage in that, unless prohibited by copyright laws or by a purchase/license agreement with the vendor, the same program can be used to boot several machines. After initializing a blank data disk, the only need for the master disk is to boot or to run the utility program.

SUMMATION

"Bank Street Writer" is an adequate word processing program for the production of small, simple tasks such as letters, memos and simple reports. It is ideally suited for use by elementary students and serves as a nice introductory program to word processing at any level. It is user friendly and inexpensive. Since commands are always shown at the top of the screen, there is no need to memorize functions.

Its major weakness is that it has limited power: there is no ability to justify, hyphenate, to globally change from lower case to upper case or vice versa, it cannot make footnotes, underscore, print in column format, etc. In addition some frustration may occur because:

1. The number of characters shown on the screen does not correspond to the print output.
2. A mode change is necessary to accommodate editing functions (to insert/change/delete words).

STATUS

"Bank Street Writer (48K Version)" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

"Bank Street Writer" is sold in two packages - a home package produced by Broderbund Software and the school version sold by Scholastic. The Scholastic package is larger - it contains 3 disks instead of 2, documentation which includes classroom implementation strategies and a reproducible student guide written with the elementary student in mind and well supported with pictures and illustrations. The School Book Branch sells the larger, Scholastic package. Although schools may find a version of Bank Street Writer selling for less than what is shown below, they should note that the S.B.B. packages contains three program disks as well as the extra additions. In addition, Scholastic program disks can be purchased individually.

Alberta schools may purchase **the Scholastic** version from the School Book Branch for approximately $90 (1985). **If a full package has been purchased from the S.B. B.** schools may also purchase individual program diskettes for approximately $40.00. In ordering, be sure to indicate if you wish the 48K or 64K/128K version (see the next report).

Defective diskettes will be replaced without charge within a 60 day warranty period. For the ten month period following the initial warranty period, defective diskettes will be replaced on a one-time basis, subject to a $5.00 replacement fee.

The diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license/purchase agreement.

BANK STREET WRITER (64K/128K VERSION)

DESCRIPTION

Title: Bank Street Writer (64K/128K Version)
Authors: Intentional Educations Inc., Franklin E. Smith & Bank Street College
Publisher: Scholastic Inc.
Source: 123 Newkirk Road, Richmond Hill, ON L4C 3G5
Subjects: Business Education/Applications, Language Arts, Computer Literacy
Components: 3 disks (2 originals, 1 back-up), 3-ring reference manual (104p.)
Version: 1984
Display Language: English
Cost: $95.00 (1984)
Tel. #: (416) 883-5300
Users : Elementary +
Screen Display: 40/80 column
System Requirements: Apple IIe/IIc, 64K or 128K, 1 disk drive, monochrome monitor, printer recommended
Optional Hardware/Software: Extended 80 column card recommended for IIe
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: HF 5548.115 B218 1984

NOTE

This report is on the enhanced version of Bank Street Writer designed for 64K/128K Apple machines. An evaluation of the original version of Bank Street Writer (48K Apple machines) precedes this assessment.

EDITOR DESCRIPTION

"Bank Street Writer" offers three modes of operation: the Write Screen, the Editing Menu and the Transfer Menu. The mode of operation and the commands available within it are continually displayed on the top of the screen. Documents are created and corrected via the WRITE screen. The four arrow keys are used to control cursor movement and the delete key is used for erasures. The program will accommodate line by line scrolling or quick jumps to the beginning or the end of a line or a document. The screen displays a 40 column mode when a standard IIe is used, however 80 column display can be accommodated with the addition of an 80 column card. (80 column display is automatic on the IIc). Up to 15 lines of text can be moved at one time. The find/replace function will search forward in text for strings up to 29 characters in length and requests individual user response for each replacement. It provides the option of matching upper/lower case exactly and of finding whole words only.

EDITOR EVALUATION

Short, simple documents can be quickly and easily created using Bank Street Writer's ever-visible commands. Screen prompts are clear and offer step-by-step instruction. Sound is effectively used to draw attention to procedural errors and error messages are simple to understand and are appropriately corrective. Cursor movement is efficient.

Scrolling is adequate but page jumps can not be accommodated. The use of reverse display to highlight text to be moved makes the process very clear; however, the restriction to 15 lines proves limiting and necessitates that large text moves must be broken down into several 15 line segments. The find/replace feature works in forward search only and unfortunately is not global in nature--each case must be individually reviewed. The deletion process proves time consuming since deletions are done by character only--there is no provision for deleting by word, line, sentence or paragraph.

FILE MANAGEMENT DESCRIPTION

File names can be no longer than eight characters in length. Either entire files or portions of files can be saved. A check question to guard against accidental deletion of files is built into each program. Although files cannot be locked, the user has the option of using a five letter password for additional security. Bank Street Writer files are stored in binary format but they can be transferred to text files for interface with the Applewriter II and IIe via the Bank Street Writer Utility Program. Data disks can be initialized directly from the Bank Street Writer master; however, copying an entire disk for backup purposes requires use of the Apple DOS COPYA if DOS 3.3 is used or use of the "copy volume" of the "Filer" program if a ProDOS system is used.

FILE MANAGEMENT EVALUATION

Documents can be easily stored and merged by following the self-explanatory screen prompts. The user has the option of limiting access to files by choosing a password; however, this results in only a very limited measure of extra security as all passwords can be displayed via the utility program on the disk. (This may be an advantage for classroom use as students who forget their password have the opportunity of reviewing it). The restriction to 5 and 8 characters for a password and file name respectively may prove limiting, especially in high school business classes where students may be doing dozens of jobs in the same topic area.

Bank Street Writer's file management system generally proves very forgiving. For example, if a student asks for a clear or a delete, (s)he is given an opportunity to change his/her mind before the process is activated. Similarly, if a user inadvertently deletes material, (s)he can recover it (if the error is discovered immediately) by use of the "unerase" function.

The conversion process of changing binary to text files and vise versa is slow.

PRINT FORMATTER DESCRIPTION

Built-in margins are set for 65 characters/line. Limited changes to the margins (a left hand margin ranging from 1 - 20 spaces) can be made via the utility program. While there are no built-in tabs, the user can set tab key inserts by selecting the "Change Setup Values" item from the menu in the Utility Program. Single, double or triple line spacing can be accommodated. "Bank Street Writer" does employ word wrap (which cannot be disabled), but it does not right justify text. Centering ability is limited to automatic centering between margins. It can print either a one-line header or footer which must occur on the same line as the page number. Page numbers may be placed in one of two positions: top center or bottom center. Depending upon the quality of printer that is used, up to sixteen printer commands can be defined which can provide such options as boldfacing, underlining or italics print.

The "Bank Street Writer" screen is divided into three sections: the top four lines display the commands, the middle 18 lines are used for text entry, and computer messages are displayed at the bottom. A display of available memory space can be obtained by hitting CONTROL S.

For ease in editing, the program will print a rough draft with a 38 character display conforming to the screen display or it will print a final draft in the margins selected by the user. (This option is available only if a standard IIe is used. If an extended IIe or IIc is used, the software senses this and offers the final print 80 column version only). Portions of a file can be printed, the option of spooling is available, and printing can be aborted at any time by pressing ESC.

PRINT FORMATTER EVALUATION

Bank Street Writer's print formatter provides the basic necessities only. The limitations in margin settings, the lack of justification, the inability to accommodate super/subscripts, the inability to hyphenate or to disable word wrap combine to limit the use of this program to very basic word processing operations only. Since centering can be accommodated betweeen margins only, newspaper column applications and the production of tables with headings are cumbersome if not impossible to do.

Print options are somewhat limiting in that while it is possible to stop printing at any time, it is not possible to reactivate it from the same point--the entire document must be reprinted from the beginning. The option of defining printer commands to accommodate varying type styles, while initially time consuming, offers a visually pleasing final product.

The program's lack of a print buffer (i.e. you cannot continue to keyboard entries while a program is printing) limits its speed of operation.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The manual (in 3-ring binder format) is divided into five sections:

1. The 'Introduction' explains what a word processor is and how it operates.
2. The 'Reference Guide' provides a detailed description of Bank Street Writer and its utility programs.
3. The 'Student Guide' contains reproducible instruction sheets for student use.
4. The 'Question and Answer' section answers questions most frequently asked.
5. The 'Student Activities' provides sample exercises for classroom use.

In addition, the back side of the master disk contains a step-by-step tutorial program which covers all editing operations. Transfer or printing operations however are not addressed on the disk.

IMPLEMENTATIONAL SUPPORT EVALUATION

The documentation is easy to read and follow and will not be intimidating to novice computer users. Its pleasing layout, orderly arrangement, and use of lay language combine to make it very readable. The suggested student activities provide good sample exercises for learning this word processing program.

The tutorial program provided on the disk provides an excellent brief introduction to the operation of the program thus enabling students to independently use the program to produce short documents within the first hour.

EASE OF USE EVALUATION

"Bank Street Writer" is exceptionally easy to use and is ideally suited for use in elementary grades, although it would serve as an excellent introduction to word processing at any level. Within a half hour of operation, the user will be familiar with the three modes of operation (write, edit, and transfer) and will be able to create short documents. The high resolution graphics screen displays are uncluttered and attractive. The program proves very easy to learn and is very reliable in normal classroom use.

It has an additional advantage in that, unless prohibited by copyright laws or by a purchase/license agreement with the vendor, the same program can be used to boot several machines. After initializing a blank data disk, the only need for the master disk is to boot or to run the utility program.

SUMMATION

"Bank Street Writer" is an adequate word processing program for the production of small, simple tasks such as letters, memos and simple reports. It is ideally suited for use by elementary students and serves as a nice introductory program to word processing at any level. It is user friendly and inexpensive. Since commands are always shown at the top of the screen, there is no need to memorize functions.

Its major weakness is that it has limited power: there is no ability to justify, hyphenate, to globally change from lower case to upper case or vice versa, it cannot make footnotes, print in column format, etc.

STATUS

"Bank Street Writer" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

"Bank Street Writer" is sold in two packages - a home package produced by Broderbund Software and the school version sold by Scholastic.

Broderbund publishes two separate editions: 1) A 40 column version which runs on Apple II+ versions that have been expanded to 64K or a standard IIe and 2) An 80 column version which runs on an Apple IIe equipped with an extended 80 column card or on Apple IIc computers, but will not run on a standard IIe.

The Scholastic version combines the 40 column and the 80 column versions of the program on the same side of the disk. In other words, one disk can be used on either a 64K or 128K computer. The Scholastic package is also larger - it contains 3 disks instead of Broderbund's 2, and its documentation includes classroom implementation strategies and a reproducible student guide written with the elementary student in mind and well supported with pictures and illustrations. The School Book Branch sells the larger, Scholastic package. Although schools may find a version of Bank Street Writer selling for less than what is shown below, they should note that the S.B.B. packages contains three program disks as well as the extra additions. In addition, Scholastic program disks can be purchased individually.

Alberta schools may purchase **the enhanced Scholastic version** from the School Book Branch for approximately $90 (1985). In ordering, be sure to indicate if you wish the 48K or 64K/128K version (see the previous report). If **a full package has been purchased from the S.B. B.** schools may also purchase individual program diskettes for approximately $34.00.

Defective diskettes will be replaced without charge within a 60 day warranty period. For the ten month period following the initial warranty period, defective diskettes will be replaced on a one-time basis, subject to a $5.00 replacement fee.

The diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license/purchase agreement.

ENTERPRISE SANDWICH SHOPS

DESCRIPTION

Title: Enterprise Sandwich Shops
Author: Lewis
Publisher: McGraw Hill Ryerson
Source: 330 Progress Avenue, Scarborough, Ontario, M1P 2Z5
Subject: Business Education
Topics: Introductory business, retailing, management, marketing, accounting, small business management
Components: 1 disk, user's manual (98p.)
System Requirements: Apple II+/IIe/IIc, 32K, 1 disk drive, monochrome monitor, 80 column printer
Other Formats Available (not evaluated): Available in Apple format only.
Alberta Education Call No.: HD 30.26 L675 1983

Version: 1982
Display Language: English
Cost: $268.65 (1984)
Tel. #: 800 223-4180
Users : High School

OBJECTIVES

"Enterprise Sandwich Shops" is designed to simulate business conditions found in a free enterprise system and to provide students with an understanding of entrepreneurship, marketing, retailing and management. Students will be able to describe the impact of pricing, salaries, taxes and other operating costs on net income; cite factors that affect productivity; read and interpret basic accounting statements; and, explain the effects of such external forces as weather, competition and advertising on demand.

PEDAGOGICAL CONTENT DESCRIPTION

The disk is designed as a data generator which, given student input from up to four students/student teams, produces monthly reports for up to an eight month period. These will detail market information, confidential business information and an income, cash-flow and balance sheet for each of the four Enterprise Sandwich Shops. Students can see the effects of marketing decisions on a company's income and profits, and the effects of other factors such as weather and competition.

The accompanying manual provides reference material on how to use the disk, suggestions for classroom implementation, transparency masters, instructor's materials, and reproducible student handouts. The teacher alone accesses the disk to input student decisions and to gain printed reports which reflect the results of those decisions. These reports are then used as the basis for classroom discussion of such concepts as marketing strategies, economic forecasts, and production management. Students are encouraged to use the results from the previous month's reports to determine the effects of supply and demand, advertising, under/over production and competition on total sales. Their aim is to improve profit given factors such as cost of goods sold, transportation charges, employee salaries and overhead costs.

PEDAGOGICAL CONTENT EVALUATION

A wide range of business and marketing topics can be enhanced when used in conjunction with this material. Marketing skills and strategies, advertising, taxation, business finance, pricing and competition are all part of the simulation.

Content range, sequence and depth are largely dependent upon the teacher's implementation strategies. To a limited extent, teachers can control depth by instructing students to begin with a very limited menu selection. As confidence is gained, they can then extend the market conditions by expanding the menu, adding equipment and personnel, acquiring loans to promote expansion, etc. The generated printouts have the potential to be excellent discussion stimulators and they do provide a realistic portrayal of market conditions; however, students would require a basic understanding of accounting reports combined with strategic teacher questioning to enable them to fully appreciate the conditions which cause market fluctuations. The introduction of periodic changes in market conditions (e.g. new competition, a cost of living raise given to employees, health department citations, charitible donations, etc.) and the assessment of a $50 accountant fee for each error occurence (e.g. failure to remain open for the required number of hours, allowing an employee to work more overtime than allowed by law, failure to make a mimimum payment on a loan, etc.) add realism to the simulation.

INSTRUCTIONAL FORMAT DESCRIPTION

This program is designed to be used by four teams of students with 3-5 persons/group in one hour class periods delivered once/twice a week for a total period of 2-9 sessions. Neither the disk nor the manual are intended to stand alone, but rather to act as a teacher administration tool to supplement class discussion of free enterprise, pricing, marketing, production management, retailing and management decision making.

Student involvement centers on strategy planning. They record their decisions on a planning sheet and the teacher in turn enters these decisions into the computer. Feedback is provided in the form of printed reports of sales, cash flow, income statements, etc. which students must then analyze to determine their next course of action. Assessment of student performance is based upon which team generates the most profit from their business operation as shown via the profit and loss statement. Competitive standings are shown both as profit/loss for the month in question as well as total profit/loss to date.

INSTRUCTIONAL FORMAT EVALUATION

Conscientious teacher preparation is required to use this program effectively. In addition, teachers must be prepared to spend at least one-half hour to input student decisions and generate the necessary reports.

The manual includes excellent implementation suggestions, catchy transparency masters and clearly written disk use instructions.

It would be helpful if the program itself could provide more planning assistance to the student in the form of additional strategy sheets (e.g. break even point, pricing policies, planned sales, personnel production and cost, etc.) and/or by including computer generated prompts to guide students in selection of an appropriate course of action.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics, color and sound are not used in this program. All printouts are generated in galley form in standard 40 column text with combination upper/lower case lettering.

TECHNICAL CHARACTERISTICS EVALUATION

Teacher input procedure for generating printouts is clearly outlined both on the disk and in the reference guide and ample opportunity is given to check the accuracy of entered data and change it if necessary. Displays are clear and input prompts are consistent. Disk interaction, both on initial load and on movement from one menu to another, tends to be slow. While the printer can produce up to nine copies of each report, it is far quicker to print only one copy per team and xerox other copies as necessary.

SUMMATION

Although very costly, "Enterprise Sandwich Shops" has the potential of being an excellent simulation provided the teacher is prepared to do the necessary initial preparation and to guide the classroom discussion in accordance with the given suggestions. Since reports are generated on the computer by the teacher outside of class time, it is ideally suited for situations where computer access is limited. "Enterprise Sandwich Shops" can make the study of business interesting for students by providing a practical business simulation that encourages students to become actively involved in developing an understanding of business enterpreneurship, marketing, retailing and management.

STATUS

"Enterprise Sandwich Shops" has been designated as a **RECOMMENDED** learning resource for Basic Business 20/30 and Marketing 20/30.

PURCHASE INFORMATION

Alberta schools may purchase the product from the School Book Branch for approximately $175.00. Defective diskettes will be replaced without charge within a 30 day warranty period. No further warranty is available. A replacement price for disks damaged after the 30 days also was not available at press time.

FORMAT II (ENHANCED)

DESCRIPTION

Title: Format II (Enhanced)
Authors: M.A.R. Hardwick & G.K. Beckmann
Publisher: Kensington Microware
Source: 919 Third Avenue, New York, New York, 10022
Subject: Business Education/Applications
Components: 1 disk, manual (179p.), reference card, shift key modification & video chip
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, shift key adapter (for Apple II+)
Optional Hardware/Software: 2nd disk drive, 16K RAM expansion card for Apple II+
Other Formats Available (not evaluated): Available in Apple format only.
Alberta Education Call No.: HF 5548.115 F724 1982

Version: 1983
Display Language: English
Cost: $150.00 U.S.
Tel. #: (212) 475-5200
Users : High School +
Screen Display: 80 characters

EDITOR DESCRIPTION

A document is created by selecting "New Page" from menu. Built-in defaults provide margins at 12 and 72 with 60 lines of printing per page. File names must be no longer than 10 characters.

Editing can be done in one of two modes: "Enter Text" mode is used for initial creation and simple typographical changes; "Format Text" mode is used for major revisions to previously written documents. Different cursors help identify the mode the user has chosen. Error messages are given at the bottom of the screen.

Scrolling is accomplished via the arrow keys, the CONTROL E key to take the user to the end of the document, or the CONTROL S key to position the cursor at the start of a word, line, sentence, paragraph or the start of the document. The "Browse" command allows use of the <-- or --> keys to skim through a document. "Horizontal Slide" and "Vertical Slide" commands can be activated to reformat parts of a document. (This is especially useful when creating forms.) Blocks of material of up to eighty lines in length can be moved.

The program offers a global search and replace feature which will search forward in text, backward, up to a certain page number, or through the entire document. The user has the option of manual or automatic replacement.

EDITOR EVALUATION

The document creation process is very straightforward and default values can be easily changed. Editing commands are easy to learn as they are mnemonic and the same commands are used in both the "Enter Text" and "Format Text" editing processes. Error identification and correction is easy to grasp; however, users may have initial difficulty adjusting to the fact that the system deletes to the right of the cursor rather than to the left as is common in most other word processing programs. Moving blocks of text involves several steps but these are clearly outlined on the screen. The search and replace function is excellent.

FILE MANAGEMENT DESCRIPTION

CONTROL S is used to store a document. If no name is given, the documents are given sequential letters of the alphabet as names and will be saved to drive one. Users are encouraged to make several backup copies of the program disk using the Apple COPYA program. The ESCAPE key can be used to abort any process. Deletion is accomplished using CONTROL D plus the document name and the drive number.

The program will interface with other software (data bases, spread sheet systems, spelling checkers, etc.) written in text file format.

FILE MANAGEMENT EVALUATION

The storing process is easy to remember both because of the mnemonics used as well as the excellent menu and prompt lines. Copying of files can be done either by the loading and saving process or by using a FID or COPYA program. The deletion process is clear and uncomplicated, however it does not offer a check question as a safeguard against accidental deletion. The program will interface with other programs, however the process can be quite involved as all files must be first changed to text file format. No password security is available.

PRINT FORMATTER DESCRIPTION

Default margins can be changed for either the entire document or for portions of the document using the CONTROL L or CONTROL R keys for left or right margin changes respectively. Individual tabulations are set and cleared using the CONTROL T key and are activated via the TAB key. All tabulations can be cleared in one operation with the CONTROL C key. Negative indentation can be handled either by resetting left and right margins or by installing parameters to cause a certain number of spaces to be printed before text is written on each line. The program provides for automatic centering of lines, paragraphs or the entire document. Multi-column documents can be accommodated by resetting margins but combined column widths must not exceed 80 characters.

The program accommodates double or single spacing and will accomplish both in one document with the use of control characters. Justification can be accomplished by line, paragraph or entire document. The user is given the option of selecting whether justification will take place via adjustments to the spaces between words only or by adjustments to both the spaces between words as well as the spacing between characters. The user can also specify the ratio of space to character (microspace justification). Text printed in multi-column format is justified one column at a time.

The program offers automatic pagination, sequential page numbering, and will print both headers and footers. Widow protection is activated by entering control characters. Word wrap is automatically invoked but it can be user disabled. The screen display constantly shows the cursor line and position, the page length and document name, the page number, the mode of operation, and the margins in current use. A close approximation of printout appearance can be achieved; however, boldfacing is indicated by brackets and underlining is shown in reverse video.

A total word count of each document can be achieved by typing "#" in the "Format Text" mode. Special character keys can be assigned via ASCII codes which are outlined in Appendix G of the manual. A built-in mailing list feature allows for the establishment of lists of names which can be merged with a standard letter format. Like a data base, Format II can store up to 16 separate fields of information in each data record and can make logical selections according to arbitrarily specified criteria (e.g. it will sort alphabetically, by numerical data, etc.). The program also incorporates the ability to write checks via a template provided that tractor feed cheque forms are installed in the printer. Print options include the ability to print selected pages only, to stop printing between pages (i.e. to change print wheels to allow a different type form), or to abort printing at any time.

PRINT FORMATTER EVALUATION

Margins and tabulations are both very easy to set. Unfortunately the program does not offer decimal tab alignment. Centering can be easily accomplished but it is limited to between margins only (i.e. it will not automatically center over the columns of a table). Screen prompts are excellent. Print options are good and are limited only by the quality of the printer with which the program is interfaced. The options in justification are excellent. Unfortunately a hyphenation feature is not available. Since each line appears on the screen as it is being printed, entry of new text while the printing process in engaged is prohibited.

The built-in mailing system option effectively prints envelopes, mailing lists, labels, etc. Its ability to sort by user selected criteria is a positive feature.

IMPLMENTATIONAL SUPPORT DESCRIPTION

The user's manual is sequentially developed with step-by-step instructions for executing each new command. A quick reference card is included with the manual. The manual contains numerous examples and illustrations and the disk contains explanations to supplement the manual in a special "ReadMe" file.

IMPLEMENTATIONAL SUPPORT EVALUATION

The manual is well organized with important areas highlighted in blue. The use of frequent titles and subtitles combined with a detailed index makes referencing easy. A quick start feature at the beginning allows the user to produce a short memorandum within a ten minute period. Functions are clearly explained with illustrations of screen prompts and options. The manual is well sequenced, beginning with simple functions and proceding to the more complex. Including more application examples would be an asset to classroom use.

EASE OF USE EVALUATION

Operating this program on an Apple II+ requires a shift key modification--the adapter can be purchased for five dollars at the time of program purchase and requires a simple insertion to the mother board. A reverse video chip is also included with the program--it may be necessary to add this to the Videx videoterm boards of some computers if they do not have the capacity to display inverse type. Explanation of installation procedure is clearly outlined.

The inclusion of sample programs on the disk offers limited screen help. Students generally find the package to be self-explanatory, although the section on printer interface may require teacher intervention. Commands are logical and easy to remember and the program proves very reliable in normal classroom operation.

SUMMATION

Logical, mnemonic commands, an easy to use editing process, and excellent print formatting capabilities combine to make "Format II (Enhanced)" an efficient word processing package for use in advanced business applications. Classroom use of this program could be improved by providing a more detailed explanation of printer format installation codes and by including more application exercises in the documentation.

STATUS

"Format II (Enhanced)" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $130 (1984). Defective diskettes may be replaced at any time for $10.00 U.S. upon return to Kensington Software. Updates of the program are also available for $35.00 U.S. (1984). Note that the package does not come with a backup disk but the publisher allows unlimited backups to be made within a school.

FREE ENTERPRISE

DESCRIPTION

Title: Free Enterprise
Publisher: Science Research Associates
Source: 707 Gordon Baker Rd., Willowdale, Ontario M2H 2S6
Subject: Business Education
Topics: Business Competition

Version: 1983
Cost: $140.00 (1984)
Tel. #: (416) 497-7707
Users : Ages 12 +

Components: 1 disk, guide (16p.), pad of record sheets, pad of decision sheets
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, blank disks, printer strongly recommended
Other Formats Available (not evaluated): IBM
Alberta Education Call No.: HF 5351 F853 1982

OBJECTIVES

This program is designed to teach the fundamentals of business organization, decision making, and analyzation of operations via a simulation of corporate activity.

PEDAGOGICAL CONTENT DESCRIPTION

Up to six students or groups of students compete against one another to generate the most favorable financial business activity for a given period. Users can choose one of three skill levels: beginner, intermediate or advanced. Parameters such as interest rates, market trends and news events which may affect productivity are randomly chosen by the computer at the beginning of each quarter's activities. Stock market reports, industry and market surveys, as well as confidential company reports are generated to aid the player in making his/her corporate decisions. Once the user inputs a decison, the program moves ahead to the next fiscal period where the cycle of reports is repeated. Games are open ended--they can be ended or saved for continuation at the end of each fiscal period. The player's success is measured by the stock market price--the winner is the player with the highest stock market price at the beginning of the thirteenth quarter.

PEDAGOGICAL CONTENT EVALUATION

As a game, this program has many merits. It provides an effective simulation of corporate decision making and its effects on the business operations of the company. The resulting computer generated reports provide detailed information on the effect of a decision on the profit/loss position of a company. The element of competition between students induces careful decision making.

This program does not instruct, rather it assumes that students already possess a firm understanding of stock market prices, market surveys, loans and interest payments, dividends, the impact of advertising and/or research and development, and are skilled in analyzing and interpreting company reports. The program itself offers a realistic application of these free enterprise concepts. There is no pre-ordered sequence--players are plunged immediately into all aspects of high finance. Depth is limited only by the player's decision to end.

The clarity of terms is vague if the disk is used alone and the accompanying written documentation is essential for efficient use of this simulation. Also, some content inconsistencies were noted such as a decline in market value when sales increased. Although this conceivably could happen in the unusual situation of a company offering goods near or below cost for an extended period of time and thus sliding towards bankrupcy, this situation is comparatively rare and an explanation of such unusual occurences is in order.

INSTRUCTIONAL FORMAT DESCRIPTION

Students can call up charts and tables which they must interpret and use as a basis for entering decisions relevant to changes in price, production, advertising, etc. Feedback consists of a beep to signify an incorrect entry and the provision of financial reports and charts (which can be obtained in hard copy) to indicate changes in the company status. Branching allows students to select one of three playing levels and to elect to see or skip over various reports. Sequence is determined by the program while rate is user controlled. Greater contol of playing parameters is provided at the advanced level than is available to novice players.

INSTRUCTIONAL FORMAT EVALUATION

Neither the content nor the feedback of this program offers instruction; it simply reflects the choices made by the user as (s)he plays through the simulation. Although the manual provides limited information regarding the effect of altering parameters, much more detailed information would be desirable.

A typical game covers a period of three years. Depending upon the number of companies in competition and the options of operation selected, the actual playing time could prove to be quite lengthy (40 or more hours). To insure maximum learning, students would have to be thoroughly taught the principles of business competition and the teacher would have to interact via group discussions and analysis of printouts at regular intervals (ideally at the end of each quarter of operation). Feedback is limited to the adjusted company reports provided at quarterly intervals from which the user must make his/her own decision--no guiding questions or prompts of any kind are given during normal company operations.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in combination upper/lower case. Graphics are used to depict the scales on a bar graph. Sound is used to call attention to incorrect entires. Color is not utilized.

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is excellent. Material is clear and easy to read, transitions from display to display are appropriate and input methods are consistent throughout. The program is reliable under normal classroom use.

SUMMATION

This disk provides a realistic application of free enterprise concepts; however, teachers must be prepared to:

1. provide initial instruction in basic business terminology and the principles of business competition.
2. devote up to 40 hours of classroom time for maximum playing benefit.
3. interact with students to ensure they are correctly interpreting the generated reports.

The disk has close parallels with Modules 4 (Economic Concepts), 6 (Management Techniques) and 8 (Small Business Management) of the Alberta Basic Business Curriculum.

STATUS

"Free Enterprise" has been authorized as a **RECOMMENDED** learning resource for Basic Business 20/30 and Marketing 20/30.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $75 (1984). Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, diskettes may be replaced for approximately $20.00. There is no time limit on this warranty.

GREGG KEYBOARDING FOR INFORMATION PROCESSING

DESCRIPTION

Title: Gregg Keyboarding for Information Processing
Authors: Robert N. Hanson & D. Sue Rigby
Publisher: McGraw Hill Ryerson
Source: 330 Progress Avenue, Scarborough, Ontario, M1P 2Z5
Subject: Business Education
Topics: Touch typing (alphabetic and numeric)
Components: 3 diskettes, 3 back-up diskettes
System Requirements: Apple II+/IIe only, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS 80
Alberta Education Call No.: Z 49 6819 1982

Version: 1982
Display Language: English
Cost: $260.00
Tel. #: (800) 223-4180
Users : Junior High +

OBJECTIVES

"Gregg Keyboarding for Information Processing" is designed to develop touch keyboarding skills to a level of 20 words per minute within a 2 error limit.

PEDAGOGICAL CONTENT DESCRIPTION

This program includes three diskettes containing 38 lessons on basic keyboarding skills:

DISK 1 - INTRODUCTION AND PRACTICE: The 24 lessons on this diskette introduce students to each alphabetic key plus selected punctuation marks. Each lesson includes four options: location drills; word drills; finger placement drills; and, a progress check.

DISK 2 - REVIEW EXERCISES: The four lessons on this diskette contain selected speed and accuracy building exercises.

DISK 3 - NUMERICS: The first five lessons introduce students to numbers as they are arranged on a standard typewriter; the remaining five provide practice on the numeric pad arrangement.

PEDAGOGICAL CONTENT EVALUATION

The content range is complete and thorough for standard keyboards (excluding special function keys) and conforms to the guidelines of the Alberta Business Education curriculum. Sequencing is correct with home row key locations being introduced first and all subsequent keys introduced relative to home row. The ability to choose sequence from the menu is fine for advanced typists who are using the program for review; however, it is imperative that the novice typist complete the lessons in order. Provided the student does all the exercises and completes review exercises as required, sufficient depth is available to meet the intended objectives. Inclusion of the keyboard numerics is of little use on the Apple computer keyboard.

While dedicated students may be able to use the diskettes independently, it would be advisable for the teacher to monitor student use, checking for correct finger control, correct typing posture, etc. Also students using this program on an Apple IIe should be alerted to the different location of the colon and semicolon key from that on the Apple II+.

Since the program lacks a management system, students must manually keep track of their progress through the lessons and teachers must likewise manually monitor student achievement.

INSTRUCTIONAL FORMAT DESCRIPTION

In this tutorial and drill program students complete continuous sets of exercises in each lesson. At the end of each lesson an error counting routine indicates the location and number of errors made. In the progress tests given at the end of each lesson, the user is required to complete the test with two or fewer errors. If (s)he makes more than two errors, the test is presented again.

INSTRUCTIONAL FORMAT EVALUATION

The straight-forward instructional format employed in these lessons is effective for someone who is determined to learn touch typing; however, the endlessly repetitive excercises may prove boring to less motivated students. Provided all parts of each lesson are completed in order, the program does meet its objective of enabling a novice typist to gain twenty words per minute efficiency. The optional branch of having an audible pacing beep insures students are keyboarding with rhythm.

Arrows are used to indicate errors and a summary score is presented after each input activity but this immediate feedback is neither inspiring nor diagnostic. Unfortunately the program does not have any built-in remediation branches--students can carry on to subsequent lessons even though their preformance on the previous one has been very poor. Even on the progress tests, only a single retest is required if the student preformed poorly the first time.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color is used only in the title frame of this program. A graphics display is used to illustrate keyboard location in the introduction to each lesson, and some graphics are used to indicate which finger is to press a particular key. A "pacing beep" can be optionally chosen to provide rhythm for typing some of the drill.

TECHNICAL CHARACTERISTICS EVALUATION

Being totally menu driven, this program is very easy to use. Displays are clear and easy to read; however, this program does not make interesting use of either graphics or color. Program value could be significantly improved by including additional graphics to clarify instructions (e.g. to portray proper posture, to illustrate correct finger movements, to show curved hand position, etc.) and by utilizing color both to differentiate between which finger controls which key and to add interest to displays. Students must be prepared for short waits after menu selection, for diskette interaction is frequent.

SUMMATION

This program, when completed in its entirety, will likely achieve its desired intents. The strength of the program could be improved by including additional graphics to clarify descriptions and by including textual support materials for further practice. (A correlating textbook "Keyboarding for Information Processing" is available from McGraw Hill Ryerson for $12.10, but it is not included as part of the package. Nor is any teacher documentation provided.) The major weakness of the package is its price which at $260 for three diskettes is somewhat high. While this does include a backup for each diskette, nevertheless schools may find that the expense of the package limits its potential use. This is even more likely as a diskette can be used with only one machine at a time.

STATUS

"Gregg Keyboarding for Information Processing" has been designated as a **SUPPLEMENTARY** resource for keyboarding modules.

PURCHASE INFORMATION

This product may be purchased for $260.00 (July,1984) from McGraw-Hill Ryerson at the address given at the beginning of the report. Defective diskettes will be replaced without charge; however, no warranty period is stated. There is no warranty for diskettes which become inoperable through normal use. Note that the package does come with backup diskettes.

As diskette access is frequent during a lesson, use of the diskette is limited to only one computer at a time.

MICROCOMPUTER KEYBOARDING

DESCRIPTION

Title: Microcomputer Keyboarding
Authors: Crawford, Eriskson, Beaumont, Robinson and Ownby
Publisher: Southwestern Publishing
Source: c/o Gage Publishing, 164 Commander Blvd., Agincourt, ON M1S 3C7
Subject: Business Education
Topics: Introduction to touch typing, speed and accuracy building
Components: 4 disks and 4 backups, teacher's guide (63 p.) titled "Basic Keyboarding & Typewriting Applications"
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, shift key adapter for II+
IBM PC family, 64K, monochrome monitor
Other Formats Available (not evaluated): TRS-80, Apple Corvus
Alberta Education Call No.: Z 49 M626 1983

Version: 1982
Display Language: English
Cost: $212.30 (1984)
Tel. #: (416) 293-8141
Users : Grades 7 - 12

OBJECTIVES

This program is designed to introduce students to touch typing of the alpha-numeric keyboard, develop reasonable speed & accuracy and teach proper typing keyboarding techniques.

PEDAGOGICAL CONTENT DESCRIPTION

This program offers 30 lessons contained on four disks:

DISKS 1 and 2 introduce microcomputer keyboard location and the proper touch typing technique for each alphabetic letter, punctuation marks and the right and left shift keys. Each lesson offers goals, technique explanation and a variety of practice routines.

DISK 3 has technique drills, continuity practice, response pattern drills and checks on speed and accuracy.

DISK 4 introduces the proper touch typing technique of the numerical keyboard and offers practice in building speed and accuracy.

The diskettes correlate with the first thirty lessons of the accompanying coil-bound, soft cover, stand-up student textbook ($11.55 additional for each book). Subsequent textbook lessons (i.e. lessons 31-60) offer instruction in symbol keys, statistical typing, word division, letter and report typing, and capitalization and punctuation reviews.

The first two disks of this product, available separately under the title "Alphabetic Keyboarding", have also been authorized for use in Alberta schools - see the evaluation elsewhere in the BusEd section of this document.

PEDAGOGICAL CONTENT EVALUATION

When completed in their entirety, these four disks offer complete, independent instruction in the correct operation of the alpha-numeric keyboard. Sequencing is excellent with three new keys being introduced with each lesson and every third lesson acting as a review. Since content is designed to be used either on a microcomputer or an electric typewriter, function keys specific to the microcomputer keyboard are not addressed. It should also be noted that although the instruction offered relative to the alpha-numeric keyboard is accurate and comprehensive, no disk instruction is given on the symbol keys (although these are introduced in the textbook). The disks offer sufficient depth of instruction to be used independently from the textbook; however, students would undoubtedly profit from the additional practice gained by completing corresponding textbook exercises.

INSTRUCTIONAL FORMAT DESCRIPTION

Students elect which lesson they would like to do from a main menu. Within each lesson, instruction is given in the location and operation of new keys and the student is then given practice in typing individual alphabetic/numeric characters, letter combinations, words, sentences, and paragraphs. If a typing error is made, the keyboard is locked, a beep is heard, the correct key is flashed on the screen keyboard display and the program waits for the correct key to be struck.

Multiple choice questions test a student's knowledge of proper technique and timed writings assess a student's speed and accuracy.

INSTRUCTIONAL FORMAT EVALUATION

Disk instruction is well organized by lessons with sub-categories easily assessible from a menu. Text instructions are clear and concise with graphics advantageously used to illustrate typing technique and keyboard locations. The student has total control of both rate and sequence; however, a beginning typist is advised to complete each lesson in order as lessons build on previously introduced concepts. While the amount of practice material is program controlled, students do have the opportunity of repeating any exercise an unlimited number of times.

Immediate feedback takes one of two forms: in the introduction to new keys, a beep sounds and the program will not proceed until the correct letter has been entered; in speed and accuracy lessons, a gross w.p.m. is presented upon completion of each specified exercise. (Note: The emphasis in the alpha-numeric introduction lessons is totally on accuracy while the emphasis in the review and practice sessions is totally on speed. When working on skill improvement, students could thus be making a unlimited number of errors; however, this would be unlikely if they had carefully completed the initial lessons with their strong accuracy emphasis.) The program takes full advantage of the computer's ability to set speed goals based upon the student's previous performance and thus proves very motivational. Frequent posture and technique reminders are also introduced throughout the lessons, although teacher supervision would still be necessary to ensure that students were heeding this advice.

TECHNICAL CHARACTERISTICS DESCRIPTION

High res graphics show the keyboard, proper posture & finger positioning/movement while sound draws attention to errors. Text is presented in combination upper/lower case with bold facing and enlarged text for emphasis.

TECHNICAL CHARACTERISTICS EVALUATION

This program makes excellent use of the computer's hi-res graphics which illustrate keyboard locations (via flashing letters) and demonstrate proper typing technique. Text is appropriately displayed in combination upper/lower case and is well-spaced on the screen. Being totally menu driven, the disks are easy to use.

A shift key modification is ESSENTIAL for use of this program with an Apple II+. This is not clearly identified in the documentation.

SUMMATION

This program offers well organized lessons and utilizes excellent high resolution graphics to illustrate proper technique. It is an effective tool for independent learning of touch typing or it could be a useful program for reviewing and sharpening keyboarding skills. In addition to the initial cost, user's must also purchase a shift key adapter (II+) and pay an additional fee of $11.55 for each textbook, if used. This financial outlay is compounded by the fact that frequent disk interaction limits use of the program to one computer at a time.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. In reviewing the IBM version, three notable differences were found.

1. The Apple product has a 40 column large size character display and the IBM version has an 80 column standard size character display. While both packages contain similar drill material, the IBM version presents longer sentences per frame.
2. The Apple product utilizes high resolution graphics and the IBM version has low resolution graphics. While the keyboard is more clearly depicted in the IBM version, motion movements involving finger movement, wrist position, operation of the return key, etc. are much clearer on the Apple's high resolution screen.
3. The IBM product depicts proper seating position at the keyboard - the Apple version does not.

Minor differences in organization of content are apparent but these are not significant. In sum, the IBM version is at least equivalent to the Apple version.

STATUS

The Apple and IBM versions of "Microcomputer Keyboarding" have been designated as **RECOMMENDED** learning resources for keyboarding modules.

PURCHASE INFORMATION

Alberta schools may purchase either version of this product from the School Book Branch for approximately $175 (Apple version, 1985). Defective diskettes will be replaced without charge within a 90 day warranty period. Note that the package contains backup diskettes. There is no warranty for diskettes which become inoperable through normal usage.

Note that the product is also being sold by Gage/Southwestern under the name of the textbook ("Basic Keyboarding & Typewriting Applications"). Also, the first part of the package is sold under the name of "Alphabetic Keyboarding" - see its evaluation elsewhere in this document (BusEd section).

As disk interaction is frequent, the product may be used with only one computer at a time.

MICROCOMPUTER ORIENTED ACCOUNTING

DESCRIPTION

Title: Microcomputer Oriented Accounting
Authors: Pillsbury, Ripperger
Publisher: Southwestern Publishing
Source: c/o Gage Publishing, 164 Commander Blvd. Agincourt, ON M1S 3C7
Subject: Business Education
Topics: General Ledger: data entry, posting, financial statements, payroll, depreciation, etc.
Components: 1 disk, backup, teacher's manual (81p.), student workbook (199p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer advised
IBM PC family, 64K, monochrome monitor, printer advised
Other Formats Available (not evaluated): TRS 80 Model III
Alberta Education Call No.: HF 5657 P642 1983

Version: 1983
Display Language: English
Cost: $103.70 (1984)
Tel. #: (416) 293-8141
Users : High School

OBJECTIVES

The objectives of this accounting program are to permit the student of accounting to become a more informed user of the microcomputer, use the microcomputer as a tool to better understand accounting and include some quantitative analysis in the basic accounting course.

GENERAL LEDGER DESCRIPTION

When used with the student workbook, the student is guided sequentially through the accounting cycle, beginning with a simple balance sheet and proceeding to ledger accounts, general journal, posting procedure, trial balance calculation, post-closing trial balance, income statement preparation, detailed calculation of closing and adjusting entries (including depreciation) and finally preparation of a worksheet and payroll register.

This program will accommodate 36 accounts with a maximum dollar amount per account of $99,999.99. Account names must not exceed 30 characters, and figures must be entered without dollar signs or commas. Credit amounts cannot be shown via a minus sign, rather a separate account (i.e. one number different from the debit account) must be used. The program will print individual ledger accounts and a journal proof, but will not print a chart of accounts. Both service and merchandising types of business can be accommodated.

Printouts are available as follows: Trial Balance, Balance Sheet, Income Statement, Partial Worksheet, Payroll, Post-Closing Trial Balance, Bank Reconciliation Statement, and a Table of Depreciation.

GENERAL LEDGER EVALUATION

The use of two separate account numbers for each account (odd for a debit, even for a credit) proves confusing to students who are accustomed to using a minus sign for credit amounts. The Chart of Accounts lacks flexibility in that no additions are possible (one must use the miscellaneous category if an account is not available) and there is no sorting of accounts (it is pre-set). The general ledger accounts are in simple "T" account form which makes them easy to use and understand, however the fact that no account balances are shown is a definite limitation. Adjusting and closing entries are illustrated and explained clearly. The printed reports conform to standard accounting practices. They are easy to generate and simple to understand, however they offer no choice in formatting. The fact that reports can be generated at any point during the accounting period is a program plus.

In general, the program content is suitable for introductory accounting where reinforcement of basic concepts is desired; however, it lacks the flexibility and advanced features common to more sophisticated programs (e.g. account balance data must be re-entered to go from one accounting period to the next, there is no way of printing out comparative statments for various accounting periods, etc.). Program sequence is excellent with exercises progressive in difficulty both within chapters and throughout the workbook.

ACCOUNTS RECEIVABLE/PAYABLE DESCRIPTION

This program does not offer a subsiduary ledger for either Accounts Payable or Accounts Receivable.

ACCOUNTS RECEIVABLE/PAYABLE EVALUATION

Incorporating Accounts Receivable and Accounts Payable in the General Ledger makes the program easy to use; however, the lack of a subsidiary ledger proves limiting in that invoices, credit memoranda, sales reports, customer credit profiles, schedule of accounts receivable/payable, etc. can not be generated.

PAYROLL DESCRIPTION

The program will print a payroll register for a single pay period based on hourly rates. All deductions are standard according to exemption classifications.

PAYROLL EVALUATION

This section is extremely simplistic in its treatment of payroll in that it is limited to a single pay period, it performs calculations based on hourly rates only, there is no carry over of records for individual employees, and there is no provision for updating deductions to reflect changes in rates. Payroll and taxation treatment utilizes United States legislation; thus this section is of little value for Canadian users.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

This program is designed to be used with a student workbook (199p.) which introduces the accounting cycle via fourteen sequenced chapters. Each chapter has three progressively difficult computer exercises which reinforce the concepts presented in the text. Appendix A and B of the workbook take the student through a complete simulation of an accounting cycle for a service and a merchandising type of business respectively.

The teacher's manual outlines program objectives, provides suggested time frames, includes supplementary information for each chapter, and has answer keys for each of the exercises.

IMPLEMENTATIONAL SUPPORT EVALUATION

The workbook and teacher's manual are well organized and very useful. The workbook contains detailed step-by-step instructions of both accounting practices as well as of disk usage and it has good illustrations and reproductions of correlating on-screen displays. Material is presented at a comfortable rate and in proper sequence. Pages in the student workbook are perforated for easy tear out. All student exercises are short and can easily be completed during one class period.

EASE OF USE EVALUATION

This program is very easy to use--most students will be using the system within fifteen minutes and will feel comfortable with all parts of the system within two to three hours. Provided students have been introduced to accounting concepts in the classroom and provided workbook instructions are followed carefully, students can use the program with little, if any, teacher intervention. Start-up and termination procedure are both equally easy and printed instructions are clear. Screen prompts are very limited (e.g. "Invalid Command") but detailed instructions and error-correction techniques are clearly outlined in the workbook and/or referenced by page number before each user activity. Error correction may prove cumbersome in that incorrectly typed letters can be easily changed if they are noticed immediately; however, once RETURN has been hit, the entire line containing the error must be retyped. The program requires a minimum of equipment manipulation, no disk swapping is required and the speed of operation is acceptable. The program provides reliable results and is bomb proof in normal classroom operation.

The disk is adaptable in that each chapter is self-supporting after chapter four. Instructors can thus alter the sequence of presentation without destroying the overall effectiveness or they can modify the order of presentation to conform to any accounting textbook they may be using. Up to 43 data sets can be stored on the disk--this means that a number of students can use the same disk provided they enter a distinguishing eight character code; however, as the program does not boot completely upon initial loading, it must remain in the drive during use.

SUMMATION

The chief strengths of this program are its ease of use, its simple, "bare bones" approach which is ideal for reinforcing introductory accounting concepts and its excellent documentation. Program drawbacks include a very weak payroll section, the inability to modify the accounting set, and the confusion which results from having to use different account numbers for debit and credit entries.

The program would appear to be ideally suited for use at the Accounting 10 level as enrichment and reinforcement after each of the unit topics has been taught in class. It would also be a useful review project in Accounting 20.

APPLE - IBM VERSIONS

This report has been based on an evaluation of the Apple version. However, in reviewing the IBM version, the only significant difference found is a 40 column display on the Apple vs. the 80 column display on the IBM. The quality of the overall product is the same.

STATUS

The Apple and IBM versions of "Microcomputer Oriented Accounting" have been designated as **SUPPLEMENTARY** learning resources for Acct. 10.

PURCHASE INFORMATION

This product may be purchased from Gage Publishing at the address shown at the beginning of the report for $103.70 (Apple,1984). Components may be bought separately for $80.65 (disk and backup), $12.15 (text-workbook) and $10.90 (teacher's manual). Prices are subject to a discount of 5% regardless of quantity.

Defective diskettes will be replaced without charge within a 90 day warranty period. There is no warranty for diskettes which become inoperable through normal usage.

As the entire program is not loaded upon booting, a diskette may be used with only one computer at a time.

SCREENWRITER II

DESCRIPTION

Title: Screenwriter II
Publisher: Sierra
Source: 36575 Mudge Ranch Road, Coarsegold, Ca 93614
Subject: Business Education/Applications
Components: Master disk, back-up, 3-ring reference guide (313p.), command reference cards
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer
Optional Hardware/Software: 2nd disk drive, 80 column card, shift key modification for Apple II+
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: HF 5548.115 S433 1982

Version: 1983
Cost: $129.95 U.S.
Tel. #: (209) 683-6858
Users : High School +
Screen Display: 40, 70 or 80

EDITOR DESCRIPTION

The editor operates in either insert/change mode or in command mode. These modes can be identified by the position of the cursor: the cursor is at the top of the screen for insert mode and at the bottom for command mode.

Document length is restricted only by disk capacity. File names can be up to twenty characters long. Built-in default values for margin lengths, number of lines per page, etc. can be user altered.

All commands are mnemonical. A short phrase describes errors; however, these must be referenced in the documentation for a full explanation. Either the arrow keys or games paddles can be used to scroll backwards or forwards by line, sentence, paragraph, block, screen or page. Blocks of material can be moved within a file, between files, or between disks by entering Control G to identify the beginning and ending points of the material to be moved, moving the cursor to the new location, and using CONTROL W to "write" the material in the new location. A global search and replace feature which operates backwards or forwards will automatically replace or allow user verification of a string up to 30 characters in length.

EDITOR EVALUATION

The process of document creation is simple and straightforward. Command structure is logical in that CONTROL plus the first letter of the desired command activates the function. As much as is possible given keyboard differences, the same commands are used for both the Apple II+ and IIe, thus facilitating movement between the two machines. Error messages are very brief and new users will likely have to consult the documentation for explanation. A good variety of scrolling options is available. The search and replace function with its backward or forward scrolling ability, user verification option, and ability to replace in upper or lower case letters is one of the most powerful we have seen in any word processing program. While editing operations are efficiently handled in the 40 and 80 character mode, editing in the 70 column mode is slow.

FILE MANAGEMENT DESCRIPTION

Disks can be initialized directly from the master disk. Documents are stored in command mode by typing "S". The user is advised to store files at frequent intervals to guard against accidental erasures due to power outages. Specific files can be copied simply by storing them under a different output name; however, the entire file can be copied only by using the systems master disk. Files can be locked to guard against accidental deletion.

The program will interface with Apple Writer files and is compatible with a spelling checking program called "The Dictionary". This product is included free of charge with the package (normally $99.95 U.S.).

FILE MANAGEMENT EVALUATION

Document storing and copying is quick and efficient. File deletion is somewhat involved and may be confusing as it is possible to delete a file but retain the file name. Applewriter interface works efficiently; however, the spelling checker program must be operated outside the Screenwriter word processing program. Unfortunately no password security is available.

PRINT FORMATTER DESCRIPTION

The program has built-in defaults for left and right margins (10 spaces), tabs set at every five spaces from 5 to 50, and a 5 space paragraph indentation. Negative paragraph indentations can be accommodated. The program offers automatic centering between margins which is activated during the printing process. Line spacing must be in whole numbers and can be changed by the user via the edit command. Word wrap is automatically invoked and cannot be user disabled. The program will accommodate proportional spacing providing the printer is compatible. Left, right or full justification of files is possible, but justification of columns is not provided. A constant display of memory space is available.

Print options allow the user to alter built-in format. Headers and footers may be specified through the edit format control menu. Hyphenation is available, but is activated only during the print process and cannot be screen viewed. The user may exercise the option of printing text to screen which provides a fairly close simulation of print output but boldfacing and underlining are shown in reverse video. Pagination options allow pages to be numbered at any position on the page. If desired, selected pages only can be numbered and the date can be optionally printed along with the page number. A display of available memory space is accessible. Spooling of documents for printing of up to 32K capacity is an option if two disk drives are used and if the printer is compatible. (The addition of extra disk drives increases storage capacity.

The program offers the ability to print up to four indexes by keying words to be referenced with embedded commands. These may be printed in either alphabetical order or in the order in which words are key entered. Macrotable(s) of up to 110 characters may also be created and can be automatically loaded into the machine during the boot up process if customized to do so. Whatever is contained in the macrotable(s) can then be inserted into the text with a single designated character.

Documents can be chain printed and printing can be stopped or aborted at any time. Horizontal line printing is supported, however vertical lines are not accommodated.

PRINT FORMATTER EVALUATION

Built in default values can be easily changed by entering embedded commands; however, some confusion may exist as changes in default values are activated during the print process only and are not visible on screen. The special features available in this program (macrotables, indexing, ability to use a joystick for cursor movement, etc.) contribute to the overall flexibility of the program. Upper case/lower case lettering can be interchanged very easily.

The inability to disable word wrap inhibits the alignments of decimal points and table information. The fact that the hyphenation process operates only during the print mode proves limiting as the operator must be present during the entire print process to decide upon appropriate word division. Unfortunately widow protection is not available.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Documentation consists of a 321 page 3-ring binder complete with reference cards for both the Apple II+ and IIe. The first three sections of the manual are designed as a progressive user tutorial: the MINI WRITER is addressed to those new to word processing and introduces personal use skills only, the CREATIVE WRITER addresses functions relevent to business applications, and the COMPLETE WRITER pools the entire collection of all available editing and printing commands. A help file included on Side B of the master diskette provides a complete listing and explanation of all editor commands.

IMPLEMENTATIONAL SUPPORT EVALUATION

The user's guide is comprehensive and logically arranged. Highlighting for emphasis and good use of sub-headings add clarity. The "Mini-Writer" section provides a quick introduction to the rudiments of word processing and enables a student to produce a short memo within ten minutes.

EASE OF USE EVALUATION

Although learning the rudiments of this program is fairly easy, acquiring proficiency in the additional functions which provide this program with its power can be very time consuming. The user must be prepared to memorize a lot of commands or to refer to the documentation to utilize the advanced features.

SUMMATION

Strengths of this program include its mnemonic command structure, its good buffer retrieval, the close parallel of operation on both the Apple II+ and IIe computers, the range of available power (i.e. ability to print indexes, macrotable functions, excellent search and replace function, etc), the close parallel between screen and print documents, and the ability to display more than a 40 character line on an Apple II+ without additional hardware. In addition, the design of the user's manual encourages immediate production of documents using only rudimentary functions and then progressively introduces more advanced features.

Weaknesses evident in the program include a lack of on-screen formatting and the need to memorize a series of embedded commands to activate special print commands. Also, the fact that the program saves files in computer memory rather than directly to disk during the editing process means that the user must be vigilent in remembering to store a document before printing or it may be forever lost.

The progressive organization of Screenwriter's II manual makes it a good choice for high school business education use as introductory classes could use the rudimentary functions described in the mini-writer section, intermediate classes could add the refinements explained in the creative writer section, and senior classes using all of Screenwriter's functions would be able to do almost any advanced business application.

STATUS

"Screenwriter II" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $115 (1984). Defective diskettes will be replaced without charge within a 90 day warranty period. There is no further warranty. Note that the package comes with a backup diskette. The package also includes "The Dictionary", a professional spelling verifier free of charge.

SIMULATED COMPUTER

DESCRIPTION

Title: Simulated Computer
Authors: Steketee Educational Software
Publisher: Edusoft
Source: P.O. Box 2560, Berkeley, CA 94702
Subjects: Business Education, Computer Literacy
Topics: Principles of computer operation, introduction to machine language
Components: 1 disk, user's guide (13p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Atari, TRS 80

Version: 1982
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (415) 548-2304
Users: Grade 7+

OBJECTIVES

As a result of using this disk, the student will be able to:

1. Understand and visualize the inner workings of a computer.
2. Acquire a basic understanding of machine language.
3. Write short, BASIC computer programs.
4. Use the comands LOAD, RUN, END, NEW, and CONT.

PEDAGOGICAL CONTENT DESCRIPTION

"Simulated Computer" demonstrates the operation of a real computer. The tutorial consists of five lessons:

1. GETTING STARTED: In this lesson, the user enters, runs, interupts and restarts a simple counting program.
2. STEPPING THROUGH: The operation of the three registers of the CPU are demonstrated and the concept of the three step machine cycle is established (i.e. load the instruction register, increment the program counter, and execute the instruction). The relationship between these registers and the other components of a computer are illustrated.
3. COMPUTER ALGEBRA: In this lesson the user enters a program at a specified memory location. The program illustrates how the execution of a program can be halted to enable the user to input data from the keyboard.
4. DECISIONS, DECISIONS: This lesson introduces the concept of decisions or conditions (e.g. determining if an input is greater than, less than or equal to a given number) and producing corresponding output.
5. COUNTDOWN: This lesson incorporates and combines all previously introduced commands into an application programming exercise.

A summary of the instruction codes, commands, and error messages is available via the HELP command.

PEDAGOGICAL CONTENT EVALUATION

This program does not teach the user how to write machine langugage programs, however it does present an effective introduction to the components that make up a computer system and the principles of computer operation. It is introductory in nature only and thus range is limited to a very simple CPU. Teachers could effectively use this disk to demonstrate the principles of computer operation.

INSTRUCTIONAL FORMAT DESCRIPTION

User interaction consists of typing into computer memory the instruction steps outlined on the program or those individually developed in conjunction with the user's guide. There is no disk questioning as such. Rather the student is expected to follow the instructions given in the manual, observe the results on the computer, and then be able to answer questions posed in the guide.

INSTRUCTIONAL FORMAT EVALUATION

This program does not fit the traditional expectations associated with a computer assisted learning package as there is no interaction, questioning or feedback in the conventional sense. However, the disk could be effectively used by a teacher to demonstrate the operation of a computer or to provide a brief introduction to machine language programming. The combination of hard-copy lessons and programmable software allows for a great deal of student interaction and leaning via the "what if" discovery approach. Since no feedback is provided by the program, teachers must be prepared to evaluate students' work and provide the necessary reinforcement.

Although sequence can be user controlled, optimal learning takes place when the lessons are completed in order. Rate is effectively user controlled via a WAIT and STEP function. Amount is likewise user controlled (i.e. dependent upon the student's input) and is limited only by the disk's storage capacity.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound is used as part of the introduction and to draw attention to syntax errors. Text is in standard size.

TECHNICAL CHARACTERISTICS EVALUATION

The displays often seem busy when a program is running since the instruction codes, content of registers and output are constantly changing in relation to student inputs. If desired, however, students can enter a command to slow down the operation of the entered program to the point where only one operation is performed at a time. Technically the program is well thought out and the built-in HELP command plus BREAK, CONTINUE, STEP and DISPLAY commands are very helpful in making this program easy to use.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The accompanying 14 page user's manual contains instructions for each lesson as well as end-of-lesson questions and suggested classroom activities. Its appendix contains a brief description of the components of a computer, a summary of the commands required in the lessons, a list of the codes and messages, and provides additional sample programs illustrating concepts covered in the lessons.

IMPLEMENTATIONAL SUPPORT EVALUATION

Use of the manual is mandatory for obtaining maximum benefit from the disk. While answering the questions is an optional activity, doing them will ensure understanding of the concepts covered. Unfortunately an answer key is not provided.

SUMMATION

Although not a stand alone program (i.e. classroom instruction and teacher/student interaction are required), this program provides interesting and valuable insights into the operation of a computer and into machine language programming.

STATUS

"Simulated Computer" has been designated as a **SUPPLEMENTARY** learning resource for Computer Processing

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from EduSoft at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, diskettes may be replaced for $5.00. EduSoft authorizes the original purchaser of each program to make one backup copy of each program for archival purposes.

Alberta distributors of EduSoft products include Alphatel Computer Products and Edupro Software. Contact the companies directly for price and warranty information (see page v. of the preface).

TOUCHTYPE

DESCRIPTION

Title: Touchtype
Author: Harvey R. Brown
Publisher: Software Spirit
Source: Box 825, Spirit River, Alberta T0H 3G0
Subject: Business Education/Applications

Version: 1.3 (1984)
Display Language: English
Cost: $100 (1984)
Telephone: (403) 864-3608
Users : High School +

Components: 1 disk, 1 back-up, reproducible user's guide (55p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, shift key modification, 80 col. card
Optional Hardware/Software: Uses up to 256K memory provided sufficient memory cards are added, 2 or more disk drives
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: HF 5548.115 B678 1983

EDITOR DESCRIPTION

Three cursor modes (text entry, editing and insert/delete mode) each have their own distinctive cursor. Cursor movement is accomplished either by using the arrow keys on the Apple IIe or by using the I, J, K, & M keys in conjunction with the ESC key on the Apple II+. ESC H and ESC L allows fast horizontal movement while ESC U or ESC N will enable quick scrolling one screen at a time. File names can be up to 23 characters long. An 80 column wide catalog is kept in memory at all times (does not need to be disk accessed after initial loading) on which up to 60 files are consecutively numbered. Files can be loaded by number rather than by name. Blocks of text up to 49 lines in length can be moved from one location to another. In addition, the user may have two separate files in memory at the same time (e.g. addresses in one file, a form letter in another) and text can be moved from one file to another. The global search and replace feature can be automatically or manually invoked but reformatting is usually necessary after using it unless both the search word and the replace word are precisely the same length. The program has the unique feature of allowing text to be entered in vertical format.

EDITOR EVALUATION

Document creation is straightforward and switching from one file to another in memory is a relatively easy process. The ability to load files by number is a time saver. Scrolling is efficiently accomplished. The program has excellent buffer capacity that enables a series of lines or rectangular blocks of material (e.g. a column of numbers) to be moved and inserted vertically, horizontally or integrated with other material. Since the editor retains two files in memory, one can move from one file to another without accessing the disk. It is possible to use the search and replace function in forward motion only and strings are limited to one line in length; moreover, the replace command does not always restore proper format when a short string is replaced by a long one and reformatting is often needed. Since each alphabetic key takes on a different function in each of the three available modes, gaining initial familiarity with the program is time consuming.

FILE MANAGEMENT DESCRIPTION

Data disks are initialized from the master diskette and the assignment of both a name and a volume number provides for data organization. On a 48K computer, files are limited to 4 single spaced pages; however, they could be as long as 30 pages if sufficient RAM cards are installed. "Touchtype" is presently compatible with Applewriter, Magic Window, Sensible Speller and VisiCalc files.

FILE MANAGEMENT EVALUATION

The use of file numbers and the first two letters of a command to load files proves efficient. There are good interface capabilities and the fact that data is stored in standard DOS 3.3 binary files enables transmission by most modem software. The maximum line length of 80 characters, while satisfactory for most business applications, does not fully utilize the capabilities of most printers. The fact that there is no password security system may prove a limitation in some classroom applications.

PRINT FORMATTER DESCRIPTION

Default margins (66 characters) can be user changed, an unlimited number of tabulations can be set and single or double line spacing is available.

The program will automatically paginate; however, no widow protection is offered. Word wrap is automatic but can be disabled. Underlining, subscripts, superscripts and boldfacing are achieved via a control character to begin and end each of these attributes. No hyphenation is available. Screen display closely approximates the printed page and a LENGTH command will provide an immediate count of the number of words in a document to a maximum of 65,536 words.

Several special features uncommon to other word processors in this price range are available: a "Number X" command numbers paragraphs or test questions; a "Word" command allows automatic entry of any word or phrase of up to 70 characters with a single keystroke; "ESC Y" aligns a column of figures (decimally); "ESC V" allows vertical text entry mode; newspaper column format is available; and, depending upon the quality of printer with which it is linked, several type fonts are also available.

PRINT FORMATTER EVALUATION

Since text is formatted on entry, the program offers a good "true to printer" screen display. The on-screen display of pagination eliminates surprise in the hard copy printout of the text. It does not appear to be possible to reformat text entered without word wrap into a re-formattable word wrap display. Print options are excellent, although it is time consuming to learn to use the embedded commands.

Centering is limited to between margins only. Justification is available but it is tedious since the cursor must be moved through each line to be justified.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A reproducible manual has a table of contents and index along with a two page command summary. Tutorials on the master disk review essential operating procedures and allow the user to try them out. Program updates are available at $10.00 per disk.

IMPLEMENTATIONAL SUPPORT EVALUATION

Explanations of functions are reasonably good; however, the presence of 'walk through' exercises would be advantageous.

EASE OF USE EVALUATION

Commands are numerous and are not always mnemonic; however, a built-in help screen of editor commands is available which, once loaded, is immediately accessible without further disk interaction. Sample files included on the disk show the program's possibilities, including print options. The user's guide provides essential operating information; however, the user should expect to spend considerable time at the keyboard exploring the available functions before (s)he will be able to edit his/her first document. It would likely take several weeks of concentrated use before the user would be comfortable with all of the available commands.

It will automatically configure on all members of the Apple II family; however, it operates most efficiently with 64K memory or more. Since the program is written entirely in machine language, it offers good operational speed.

SUMMATION

"Touchtype" is designed for the serious word processing operator interested in advanced business applications. It is a powerful word processing program compared with others in the same price range. A constant display of commands eliminates the need to memorize them, and a disk tutorial program aids in their initial acquisition. While the documentation is reasonably good, users must be prepared to spend hours at the keyboard experimenting with the functions available in order to effectively utilize the available options.

STATUS

"Touchtype" has been designated as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $55 (1984). Defective diskettes will be replaced within a 30 day warranty period. Thereafter, diskettes may be replaced for approximately $10.00. Note that the package comes with a backup diskette.

TYPING TUTOR II

DESCRIPTION

Title: Typing Tutor II
Authors: Dick Ainsworth & Al Baker
Publisher: Microsoft Corporation
Source: 10700 Northup Way, Bellevue, Washington, 98004
Subject: Business Education
Topics: Typing letters, numbers and symbols
Components: 1 diskette, guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer (optional)
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: Z 49.2 T991 1981

Version: 1981
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (206) 828-8080
Users : Junior High +

OBJECTIVES

Typing Tutor II is designed to develop and monitor individual typing speed and accuracy. The user is assumed to know typewriter character locations and proper fingering techniques.

PEDAGOGICAL CONTENT DESCRIPTION

The content includes complete keyboard coverage: letters, numbers and symbols. Selection of the numbers unit will provide the user with practice in letters as well as numbers. Similarly, selection of the symbols unit includes practice in letters and numbers as well.

Within a unit the student may take a lesson, practice or be tested.

In the lesson, the program identifies the letters/numbers/symbols on which the user requires practice and provides drills on those characters. Drill material is selected based upon the timed speed and accuracy of the user. Letters which the student types with ease are dropped from the practice drills and characters typed with hesitancy are repeated until a proficiency of approximately 30 wpm is gained. After 10 drills, the student may choose to continue the drill, learn new keys, build speed, practice paragraphs (on the letters learned so far) or look at the progress report.

In the practice unit, paragraphs containing all the keyboard characters are presented for practice.

The test unit generates a paragraph designed to test the user's progress. Three test paragraphs are on the diskette and these may be edited or others added. A detailed progress analysis is presented at the end of the test.

PEDAGOGICAL CONTENT EVALUATION

The drill exercises are not meant to teach keyboarding as no instruction is provided in such integral areas as key location, fingering technique, or shift key operation. Rather they are designed as drill and practice for students who have mastered key locations via classroom instruction. The program is well sequenced in that once a student demonstrates proficiency in typing any one character it is dropped from the practice routine and a new character replaces it. Ample depth is provided through branching which allows students to repeat drills. The option of being able to increase/decrease the required speed of input assures a challenge to even the most proficient typist.

The content of this diskette allows for good measurement of typing speed and accuracy. The ability of the teacher to edit the content is an advantage.

INSTRUCTIONAL FORMAT DESCRIPTION

The student interacts with the program by entering letters, numbers and symbols below the drill/test material. The copy material may consist of letter combinations or actual words and sentences. The content of the copy material follows certain parameters but as it is modified to reflect the user's strengths and weaknesses, the copy is in effect randomized for each user.

Correct entries result in the cursor proceeding directly to the next letter/word. Incorrect entries are accepted but there is an accompanying audio beep.

Quantitative feedback is available at the end of drills and tests and consists of information on keys missed, slow keys, accuracy, and words per minute .

INSTRUCTIONAL FORMAT EVALUATION

The same method of presentation is used for all drills, new letters, etc. There are no variations for someone who is having difficulty other than to repeat those parts that give trouble. Drill material is individually selected for each user based upon his/her demonstrated speed and accuracy. Letters typed correctly and quickly are replaced by either new letters or letters which have been typed with hesitation. While this instructional technique has merit, the nonsense words that result from the letter combinations definitely inhibit a student's ability to type by context.

Feedback is satisfactory. Summary statements are given after every entry and are continually updated to reflect student progress. Users should be made aware that an error, such as omitting a space, can make all their subsequent entries incorrect until the spacing inaccuracy is corrected.

Control of the various aspects of the program is satisfactory. The user can choose the content and the type of practice, and on drills (s)he can choose to increase or decrease speed from the 30 wpm pre-set rate.

TECHNICAL CHARACTERISTICS DESCRIPTION

Characters are entered in standard size print, upper case letters only. While no graphics or color are used, sound is used to notify the user when an error has been made.

TECHNICAL CHARACTERISTICS EVALUATION

Program menus are designed well and the language level is appropriate. There is a need, however, for additional explanatory and instructional input such as reminders regarding next steps, pace of screen visuals, etc. as the user progresses through the program.

Display quality could be improved. Paragraphs on the screen are crowded and some letter confusion exists (e.g. v or u). The Apple's graphic capabilities could have been better used to motivate reluctant students.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Management system options are: 1. review student records; 2. select test paragraphs (from seven available choices); 3. edit test paragraphs; 4. change the password; 5. delete/add students; and 6. produce a print copy of test paragraphs.

The system has a capacity of 49 students.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. It is accessible only by password, thus security is maintained. It is incumbent upon the teacher to input new test paragraphs periodically, for although the computer randomly selects among its three inherent test paragraphs, these soon become repetitive and tiresome. The printer interface capability allows hard copy generation of test paragraphs. This is useful for individual student practice and allows the teacher to maintain a file of test material.

SUMMATION

This program should be used only after complete classroom instruction has been given in keyboard entry. Experienced students will be motivated by the adjustable speed challenge of the program and the immediate and continuing feedback. Beginning typists would have difficulty learning correct keystrokes and technique (if this program were his/her only instructor) and might find the dearth of directions and the pre-set speed confusing. Also, students who have been conditioned to type by word rather than letter-by-letter may find the random character generation to be frustrating.

STATUS

"Typing Tutor II" has been designated as a **SUPPLEMENTARY** learning resource for keyboarding modules.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (1984) from Microsoft at the address given at the beginning of the report. Diskettes which fail to work properly when first opened will be replaced without charge. If for any reason, a diskette becomes damaged at any time during ownership, it can be replaced for a $5.00 charge.

In Alberta the diskette may be purchased from Edupro Software and Roxcel (see page v of the preface). Contact the companies directly for price and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time as the diskette is accessed only for recording scores or for starting new users; however, such use is subject to copyright laws and any license or purchase agreement.

VISICALC (UPGRADED VERSION)

DESCRIPTION

Title: Visicalc
Author: Software Arts Products
Publisher: Software Arts Products
Source: c/o Precor Canada, 140 Doncaster Ave. Unit 11, Thornhill, ON L3T 1L3
Subject: Business Education/Business Applications
Topics: Financial modelling, statistical reporting
Components: 1 disk, user's guide (91p.), DIF technical specification manual
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Optional Hardware/Software: Printer, 16K RAM card (for Apple II+) and a second disk drive are strongly recommended
Other Formats Available (not evaluated): Atari 800, Commodore PET or CBM 2001/B, 2001/N, and CBM 8032, IBM PC
Alberta Education Call No.: HF 5548.4 .v5 V831 1984

Version: 1981 - Upgraded Version
Display Language: English
Cost: $150.00 (1984)
Tel. #: (416) 731-2022
Users : High School+

NOTE

Two versions of Visicalc are currently being produced by Software Arts - this evaluation is on the 'Upgraded Version'. Also available is the 'Enhanced Version' which adds many features missing from the product described and evaluated below. The enhanced version permits individual column width modifications, multi-spreadsheet consolidation, column and row protection and macro commands. It also offers on-screen help. Several financial functions have been added (e.g. modulo, rounding, weighted averaging) and the move, insert and delete commands have been enhanced. Please note that the evaluative and descriptive comments below refer to the upgraded version and not to this enhanced version. Readers will note later in the report that both of these versions are being sold within a 'Visicalc Package'.

CAPACITY DESCRIPTION

The VisiCalc screen layout is essentially a columnar pad consisting of 63 rows and 254 columns; however, memory constraints limit the data that can be entered. If complicated formulas are entered in cells, less room will be available than if simple statisical data are stored there. According to the documentation, there is approximately 9K of memory available, for calculations on a 32K machine and 25K in a 48K machine. The amount of usable space depends upon the computers RAM memory space and can be increased with the addition of language cards. A constant display of available memory is provided on the top "Entry Contents Line".

The columns are labelled with alphabetic characters (A-Z, AA-BK); the rows are numeric (1-254); and the intersections are referenced by a combination (e.g. BK10).

PERFORMANCE FUNCTIONS DESCRIPTION

VisiCalc features a complete set of arithmetic operations (+,-,x,/) and exponentiation; financial functions such as net present value, sum, average, minimum and maximum, count, Pi, table lookup, absolute value, integer value, square root, log(10), and trigonometric functions. Conditional/logical operations include commands such as TRUE, FALSE, NOT, AND, OR, and IF. Additionally the CHOOSE command allows the selection of a particular element within a list, based on the result of another calculation.

Any position on the VisiCalc worksheet can be defined as a label, value or formula. Furthermore any formula can relate to any other position or combination of positions on the sheet, and whenever any position's value changes, all other items that depend on that value change automatically. A replicate command enables the user to create rows or columns of repetitious values or formulas. Errors are corrected via the ESCAPE key.

Since the screen is only 40 columns wide, it is not possible to see the entire screen at once, rather it must be scrolled into screen position via keyboard characters. VisiCalc contains two windows which divide the display into two parts, either horizontally or vertically, to enable simultaneous viewing of separate portions of the worksheet. Titles in both of these windows can be fixed while the portions of the table it relates to can be scrolled. The default column width is set at 9, however this can be globally changed from 3 to 37.

FORMATTING AND PRINTING DESCRIPTION

Values can be formatted in dollars and cents, scientific or integer numbers, and flushed right or left. Formulae can be edited without the need to retype them.

Although VisiCalc is compatible with all line printers, the process of printer configuration is quite involved. It permits commands which will suppress or add line feeds and adjust the column width. Portions of worksheets can be printed by positioning the cursor at the top left and the bottom right of the material to be printed. Either the calculations or the formulas can be printed. VisiCalc will not paginate automatically.

INTERFACE ABILITY DESCRIPTION

Files can be stored as formulas for the calculations on the worksheet or in Data Interchange Format (DIF) for use with VisiCalc-compatible programs or other programs using the DIF format.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The user's manual contains an explanation section for users who have had no experience in programming. A four-lesson 77 page tutorial offers practical examples and illustrations of basic operations; however, potential uses are left to the user's creativity. A 144 page command reference section offers explanations and some examples of each command using screen illustrations. The manual is indexed and a quick reference command summary card is included. Numerous print and software support materials to assist in classroom implementation of VisiCalc are available from a variety of publishers.

PROGRAM EVALUATION

Strengths:

1. VisiCalc enables the user to build a statistical model of their own choosing, make changes, and see the recalculated results immediately.
2. Although VisiCalc has the inherent ability to produce rudimentary bar graphs, its interface with other members of the Visi family enables a wide range of capabilities (pictorial graphing, filing, sorting, merging, etc.)

Weaknesses:

1. Apple users who have been used to hitting the left arrow key to correct a mistake may experience problems adjusting to the new use of the arrow key in VisiCalc: it is used to move the cursor from field to field. (i.e. If you are typing a long formula, make an error and hit the arrow key by mistake, the program will jump you back to the previous field. Upon returning to the field where you were initially entering the formula, you will find it blank because it had not yet been set via the RETURN key.)
2. VisiCalc does not offer a convenient way of reviewing formulae. (A formula is displayed at the top of the screen when the cursor is on the field, but it is not convenient to review all formulae in this manner.)
3. VisiCalc's printing format often truncates long descriptive labels because of the need to reduce the field width to get more columns on a printed report. These abbreviated labels may mean that business reports may need to be retyped in order to be understood by a lay user.
4. VisiCalc can not be unloaded--the computer must be turned off before another program can be run.
5. Although column widths can accommodate 3 to 37 characters, independently variable column widths cannot be set. (Although there may be times when it is desirable to have one column wider than the rest, this is not possible--the same width must apply to all columns of the spreadsheet.)
6. Mathematical calculations are done from left to right without regard to precedence rules.
7. VisiCalc can not do alphabetic or numeric sorts.
8. The documentation is written for a keen and highly motivated user.

Supplemental teaching aids are necessary for classroom implementation.

SUMMATION

While a user must be prepared to invest considerable time initially learning VisiCalc, it is a versatile and powerful program applicable to a wide range of business applications. Numerous print and software support materials have been developed to assist in its classroom implementation.

STATUS

"VisiCalc (Upgraded Version)" has been authorized as a **RECOMMENDED** learning resource for Bus. Ed. 10/20/30.

PURCHASE INFORMATION

This product is currently made available as part of a package entitled "Visicalc Package". In addition to the upgraded version (1 disk, any Apple family member), the package contains "Visicalc - Advanced Version". This is a two disk product which works on an Apple IIe or IIc with 128k.

The "Visicalc Package", consisting of three disks (two Visicalc versions), may be purchased from the School Book Branch for approximately $115 (1984). Defective diskettes will be replaced without charge at any time. Disks which become inoperable through normal usage may be replaced for approximately $30.00 at any time.

THE WHATSIT CORPORATION

DESCRIPTION

Title: The Whatsit Corporation
Author(s): None Cited
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Business Education, Mathematics
Components: 1 disk & backup, teacher's guide (54p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model III/IV

Version: 1983
Display Language: English
Cost: $49.00 U.S.(1984)
Tel. #: (914) 769-5030
Users: Grade 6 - Adult

OBJECTIVES

This package is designed to:

1. Provide practice in calculating, estimating, record keeping, working with equations and multiple variables, and reading graphs.
2. Teach students to use mathematics as an analytical tool in making decisions and finding solutions.
3. Provide simulated experience in managing a business.
4. Develop problem-solving skills such as planning ahead, working in two time frames, and evaluating and modifying a strategy.

CONTENT DESCRIPTION

This program is a simulation in which a student runs a small, one product business for up to six months. The user may conduct market surveys, buy a franchise, hire outside consultants, take out a loan, etc. Weekly and monthly decisions involve hiring and laying off people, ordering inventory, setting prices, paying off loans, hiring accountants, and buying advertising services. A monthly statement of income and expenses provides students with information on which to base their next month's decisions.

CONTENT EVALUATION

Students must have classroom instruction in business and marketing terminology prior to using this program. Although the target audience is specified as grade six to adult, the range would be most appropriate to upper junior high students or possibly as a review of basic math skills at the high school level. The option of repeating the simulation as often as desired provides ample depth.

Used in a math classroom, this program offers an interesting approach to basic calculations (addition, subtraction, multiplication, division) and some formula applications (e.g. interest calculations).

This program could also be used in a business education classroom to provide a very basic introduction to marketing/business strategies; however, caution must be exercised to assure that students understand that it is a bare-bones simplified model that is being portrayed and that running an actual business involves a host of factors not even alluded to in this simulation (e.g. overhead expenses, taxes, insurance costs, marketing and distribution costs, etc.) While the program should provide students with an understanding of the need for careful planning, decision making and record keeping in order to make a profit, the options of bankruptcy or receivership should a business be unsuccessful are not discussed. Furthermore the limitation to selling just one item may be unrealistic and the practice of allowing repeated rush orders of 40 items of inventory may inculcate poor business habits.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of making choices from weekly and monthly decision menus and entering the requested numerical data. Feedback consists of a double check on the accuracy of student input, reminders of decision already made or to be made before a new decision can be implemented, quantitative monthly reports (income statements) and weekly qualitative reports (e.g. "We ran out of whatsits"). There is no formal evaluation of student success--students are left to analyse their productivity based upon the results of the monthly statement provided.

Rate is user controlled; sequence and amount are program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The amount and type of student interaction is appropriate for the target audience; however, the level of abstraction combined with the attention span required for the six month run may be beyond the range of the younger students. (This is partially alleviated, however, by the ability to save an "in progress" simulation for resumption at a future time). The simulation utilizes an effective method of inquiry causing students to apply high level thinking skills. While feedback is very limited, the cueing prompts are effective in aiding students in decision making. Weaker students lacking skills in self-evaluation may need teacher assistance in analyzing their performance.

The simulation lends itself to either an individual or team approach.

TECHNICAL DESIGN DESCRIPTION

Displays are totally textual in nature and utilize combination upper/lower case standard size lettering. Color in the form of underlining is used for emphasis. A series of clicks draws attention to economic forecasts and beeps are used to denote entry errors.

TECHNICAL DESIGN EVALUATION

Character size is appropriate, screen displays are clear and transition is smooth. Unfortunately the program does not allow a review of previous decisions and their financial outcomes. It would be most appropriate to utilize graphs and charts to provide this information to aid in wise decision making. The minimal use of color and lack of graphics make the program appear dull to younger users. The ability to save data to permit continuation at a future date is a program strength.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The sixty page teacher's guide provides instructions, activity master sheets, and transparency masters which are essential for use prior to program operation. The program will store up to 40 sets of student data.

MANAGEMENT SYSTEM EVALUATION

The teacher's guide and the user pre-activity materials provide excellent and essential program support. The ability to store data for future resumption is advantageous, however it would be useful if the teacher could actually view the results of a student's decisions in order to assist him/her in making a self-analysis of progress. (At present, the teacher can delete files but cannot view them).

SUMMARY STATEMENT

Provided students have been thoroughly versed in business terminology via classroom instruction and the use of the user activity sheets, this simulation provides an interesting application of basic math concepts and business decision making skills.

STATUS

"The Whatsit Corporation" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

BUSINESS EDUCATION/APPLICATIONS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
A B BUSCAGLIA	LETTER WRITER	0.0	40
ACCESS TECHNOLOGY	20/20	0.0	40
ACTION RESEARCH NORTHWEST	ZARDAX	0.0	60
ADVANCED DATA INSTITUTE	ALADIN	0.0	40
ADVANCED OPERATING SYSTEMS	BUSICOMP	0.0	40
ALPHA SOFTWARE	ELECTRIC DESK	0.0	40
AMERICAN SOFTWARE SYSTEMS	WORD TYPE	0.0	40
APPLE COMPUTER COMPANY	APPLE WRITER II+	1981.0	42
ARKTRONICS	JANE	0.0	40
ARTSCI	MAGIC WINDOW 2	1982.0	43
ARTSCI	THE MAGIC OFFICE SYSTEM	0.0	40
AT YOUR PACE SOFTWARE	TYPING MADE EASY	1983.0	41
BEHAVIORAL ENGINEERING	LETTER MAN	0.0	40
BEHAVIORAL ENGINEERING	TYPING STRATEGY	0.0	40
BLS	COMMUNICATION THEORY	0.0	50
BLS	EFFECTIVE BUSINESS LETTERS	0.0	50
BLS	ORAL COMMUNICATION	0.0	50
BLS	WRITTEN COMMUNICATION	0.0	50
BLUE CHIP SOFTWARE	MILLIONAIRE	1982.0	42
BLUE CHIP SOFTWARE	TYCOON	1983.0	70
BRENT RESOURCES GROUP (PREV. BPI)	GENERAL LEDGER	0.0	60
BRODERBUND SOFTWARE	GENERAL LEDGER	0.0	40
BRODERIK	BIS GENERAL LEDGER ON LINE	0.0	60
BUSINESS SOLUTIONS	THE INCREDIBLE JACK	1982.0	43
BUSINESS SOLUTIONS INC	JACK 2	0.0	40
BUSINESSMASTER	GENERAL LEDGER	0.0	60
CHANG LABS	PLAN SERIES	0.0	40
CHARLES MANN	BASIC TEACHER	0.0	60
CHARLES MANN	DOCUWRITER	0.0	60
CHARLES MANN	FLOATING POINT DICTIONARY	0.0	60
CHARLES MANN	MASTER TEXT PROCESSOR	0.0	60
CHARLES MANN	ONE TYPE ACCT SYSTEM1	0.0	60
CIRCADIAN SOFTWARE	CIRCASCRIPT PLUS	1983.0	41
COMPUMAX	MICROLEDGER	1980.0	41
COMPUSO	BUSINESS ACCOUNTING SYSTEMS 1,2,3	0.0	40
COMPUSO	BUSINESS PACKAGE 1 - 4	0.0	40
COMPUSO	PERSONAL ACCOUNTING	0.0	40
COMPUTATIONS	TYPING TEACHER	1981.0	41
COMPUTER CONCEPTS	PAGE PROCESSOR	0.0	40
COMPUTER PRODUCTS INTERNATIONAL	GENERAL LEDGER	0.0	40
COMPUTER SERVICES	INTEGRATED BUSINESS & ACCOUNTING SYSTEM	0.0	40
COMPUTERIZED MANAGEMENT SYSTEMS	FINANCIAL MANAGEMENT SYSTEM 2	0.0	40
CONTINENTAL SOFTWARE	COMPUTER PROGRAMMED ACCOUNTANT GENERAL LEDGER	0.0	60
CONTROL DATA PUBLISHING	KEYBOARDING FOR INFORMATION PROCESSING	1982.0	42
CREATIVE DISCOUNT SOFTWARE	PERSONAL TEXT PROCESSOR	0.0	40
DAKIN 5	CONTROLLER	0.0	60
DATA SOFT	TEXT WIZARD	0.0	40
DATACOPE	DATACOPE SCRIBE	0.0	60
DECISION SUPPORT SOFTWARE	THE ACCOUNTANT	1983.0	60

40-43: UNFAVORABLE EVALUATION RESULTS
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BUSINESS EDUCATION/APPLICATIONS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
DENVER SOFTWARE	ACCOUNTING TUTOR	0.0	60
DOW JONES/IRWIN	AN ACCOUNTING EXPERIENCE WITH A MICROCOMPUTER	0.0	40
DOW JONES/IRWIN	THE ACCOUNTANT MONEY MASTER	0.0	40
EASTERN HOUSE SOFTWARE	PIG PEN	0.0	40
EDUCATIONAL ACTIVITIES	KEYBOARDING	0.0	60
ELECTRONIC ARTS	GET ORGANIZED	0.0	40
EXECUTIVE SOFTWARE	READY WRITER	0.0	60
FULLMER & ASSOCIATES	TYPEMASTER	0.0	60
GEORGE OTIS COMPANIES	BUSINESS ACCOUNTING PACKAGE	0.0	40
GOLWAY COMPUTER ENTERPRISES	ACCOUNTS RECEIVABLE/ACCOUNTS PAYABLE	0.0	40
H & E COMPUTRONICS	BUSINESS PAC 100	0.0	60
HAYDEN SOFTWARE	GENERAL LEDGER	0.0	40
HAYDEN SOFTWARE	GENERAL LEDGER	0.0	40
HAYDEN SOFTWARE	MICROTYPING II	1983.0	41
HAYDEN SOFTWARE	PIE WRITER	0.0	60
HIGHLANDS COMPUTER SERVICES	EZ LEDGER	0.0	40
HOHENBRINK	TEXT EDITOR	0.0	40
HOUGHTON MIFFLIN	KEYSTROKES: KEYBOARDING FOR INFORMATION ENTRY	1984.0	41
IBM	IMB ASSISTANT SERIES	0.0	40
INDIAN HEAD SOFTWARE	RULE OF 78	1980.0	41
INNOVATIVE SOFTWARE	SMART	0.0	40
INSOFT CORPORATION	ACCOUNTANT GENERAL LEDGER	0.0	40
INTELLIGENT COMPUTER SYSTEMS	Q TEXT	0.0	60
JONES, WILLSON	GENERAL LEDGER	0.0	60
KASTER CORP	DESKMATE	0.0	40
KENSINGTON MICROWARE	FORMAT TWO	0.0	40
KEYBOARD PRODUCTIVITY	ACCUTOUCH	1983.0	41
LAST	QUICKWRITER	0.0	40
LIGHTNING SOFTWARE	MASTERTYPE	1981.0	43
LJK ENTERPRISES	LETTER PERFECT	0.0	40
LOTUS DEVELOPMENT CORPORATION	SYMPHONY	0.0	40
LOTUS DEVELOPMENTS	LOTUS 1,2,3	0.0	40
M D SOFTWARE	WORD PROCESSOR 2	0.0	60
MCGRAW HILL	ACCOUNTING APPLICATIIONS FOR THE MICROCOMPUTER	0.0	40
MCGRAW HILL	MICROCOMPUTER ACCOUNTING APPLICTIONS	0.0	40
MCGRAW HILL RYERSON	DECISION MAKING SIMULATIONS	0.0	70
MCGRAW HILL RYERSON	MICROCOMPUTER APPLICATIONS FOR ACCOUNTING SYSTEMS	0.0	70
MCGRAW HILL RYERSON	MICROCOMPUTER TESTING	0.0	70
MCGRAW HILL RYERSON	PERSONAL KEYBOARDING	1982.0	41
MCGRAW HILL RYERSON	PROFIT & LOSS	1982.0	41
MEDIA MATERIALS	BOTTOM LINE	0.0	60
MEDIA MATERIALS	HIT THE NET	0.0	60
MEDIA MATERIALS	MOVING RIGHT ALONG	0.0	60
MERIT AUDIO VISUAL	KEYBOARDING PLUS	1984.0	41
MICRO LEARNINGWARE	PACKAGE 1 BUSINESS EDUCATION	0.0	60
MICRO LEARNINGWARE	PACKAGE 2 BUSINESS EDUCATION	0.0	60
MICRO LEARNINGWARE	PACKAGE 3 BUSINESS EDUCATION	0.0	60
MICRO PROGRAM DESIGNS	STOCK MARKET TYCOON	1982.0	41
MICRONATION	GUTENBERG	0.0	40
MICROPRO	STAR FAMILY	0.0	40

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BUSINESS EDUCATION/APPLICATIONS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
MICROSOURCE	LEDGER PLUS	0.0	40
MISCROSOFT	WINDOWS	0.0	40
MONEYDISK	NO NONSENSE BOOKS	0.0	40
MONUMENT COMPUTER SERVICE	LETTER MASTER	0.0	40
MONUMENT COMPUTER SERVICE	REPORT WRITER	0.0	60
MONUMENT COMPUTER SERVICES	ACCOUNT KEEPER	0.0	60
MONUMENT COMPUTER SERVICES	LETTERITE	0.0	40
MPA	WORD PROCESSING	0.0	40
MUSE SOFTWARE	SUPERTEXT 2	0.0	60
NIBBLE	LEXICON	0.0	40
PADMEDE COMPUTER SERVICES	INCOMPLETE RECORDS ACCOUNTING SYSTEM	0.0	40
PARTICORP	PRACTICALC 2	0.0	40
PEACHTREE SOFTWARE	GENERAL LEDGER	0.0	40
PEACHTREE SOFTWARE	MAGIC WAND	0.0	40
PEACHTREE SOFTWARE	PEACH TEXT	1982.0	60
PERSONAL COMPUTER SERVICE	MIGHTY NITE	0.0	40
PRENTICE HALL	THE PROFIT CENTER	0.0	40
PROPHECY INVESTMENTS	WHEELER DEALER	1981.0	41
RAINBOW COMPUTING	WRITE ON	0.0	60
SCHOOL COURSEWARE JOURNAL	TYPING	1982.0	41
SCHUCHARDT SOFTWARE	INTESOFT	0.0	40
SCOTT FORESMAN	ACCOUNTING ASSISTANT	0.0	40
SELECT INFORMATION SOFTWARE	SELECT	0.0	40
SERENDIPITY SYSTEMS	GENERAL LEDGER	0.0	40
SHERIDAN COLLEGE	MICRO TYPING	1982.0	41
SIERRA	HOMEWORD	1983.0	42
SIERRA	SUPERSCRIBE 2	0.0	40
SILICON VALLEY	WORD HANDLER 2E	0.0	60
SIRIUS SOFTWARE	TYPE ATTACK	0.0	40
SMALL BUSINESS COMPUTER SYSTEMS	GENERAL LEDGER	0.0	60
SMALL BUSINESS SOFTWARE	GENERAL LEDGER/ACCOUNTS RECEIVEABLE/ACCOUNTS PAY	0.0	40
SOFSYS/PERSONAL BUSINESS SYSTEMS	EXECUTIVE SECRETARY	0.0	40
SOFTREND	AURA	0.0	40
SOFTWAND SOFTWARE	SUPERLEDGER	0.0	40
SOFTWARE ARTS	SPOTLIGHT	0.0	40
SOFTWARE DIMENSIONS	GENERAL LEDGER	0.0	40
SOFTWARE PRODUCTS INTERNATIONAL	OPEN ACCESS	0.0	40
SOFTWARE TECH FOR COMPUTERS	GENERAL LEDGER	0.0	60
SOLIDUS INTERNATIONAL CORP	GENERAL LEDGER	0.0	60
SOUTH-WESTERN PUBLISHING CO	VIDEO GALLERY SALES AND SERVICE	0.0	42
SOUTHWESTERN DATA SYSTEMS	CORRESPONDENT	0.0	60
SOUTHWESTERN PUBLISHING	ALPHABETIC INDEXING RULES	1984.0	42
SOUTHWESTERN PUBLISHING	DATA ENTRY ACTIVITIES FOR THE MICROCOMPUTER	1982.0	42
SOUTHWESTERN PUBLISHING	MICROCOMPUTER ACTIVITIES FOR OFFICE PROCEDURE	1984.0	42
SPECTRUM SOFTWARE	M.ACCOUNTANT	0.0	60
STATE OF THE ART SOFTWARE	GENERAL LEDGER	0.0	60
STRATEGIC SIMULATIONS	CARTELS & CUTTHROATS	0.0	60
STRUCTURED SOFTWARE	WINDOW MASTER	0.0	40
T/MAKER INTEGRATED SOFTWARE	T/MAKER	0.0	40
TCS SOFTWARE	GENERAL LEDGER	0.0	40

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BUSINESS EDUCATION/APPLICATIONS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
TCS SOFTWARE	TOTAL LEDGER	0.0	60
TECK	TYPING	0.0	40
TELEPHONE SOFTWARE CONNECTION	WALL STREET JOURNEY	0.0	60
THORN EMI COMPUTER SOFTWARE INC.	PERFECT SOFTWARE	0.0	40
UNITED SOFTWARE OF AMERICA	THINKER	0.0	40
VANDATA	GENERAL LEDGER	0.0	40
VISICORP	FLASHCALC	0.0	60
VISICORP	VISI ON	0.0	40
WESTWARE	SYSTEMS 2 EX	0.0	40
WISE OWL WORKSHOPS	PERSONAL EXPENSE RECORD	0.0	50

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COMPUTER LITERACY/SCIENCE INDEX

AUTHORIZED

TITLE	PUBLISHER	GRADES	STATUS	PAGE

As of April 30, 1985, no titles had been specifically authorized for Computer Literacy/Science; however, a number of products authorized for use in Business Education may be appropriate for Computer Literacy or Computer Science. Please refer to the Business Education Index.

UNDER THIRD STAGE REVIEW

Bank Street Writer (48K Version)	Scholastic	Elem. +	Recommended (Bus)	Bus 9
Bank Street Writer (64K/128K Version)	Scholastic	Elem +	Recommended (Bus)	Bus 13
Computer Literacy	Control Data	5+	Still Under Review	Comp 3
Computer Science I	Microcomputer Workshops	7 - 12	Still Under Review	Comp 5
Databases	Control Data Publishing	7 - 12	Still Under Review	Comp 7
Micros Made Easy	Science Research Associates	4+	Still Under Review	Comp 9
Simulated Computer	Edusoft	7+	Supplementary (Bus)	Bus 31
Sorting Techniques I	Microcomputer Workshops	10+	Still Under Review	Comp 11
Sorting Techniques II	Microcomputer Workshops	10+	Still Under Review	Comp 13
Spectrum: Patterns & Programs	Sunburst Communications	6+	Still Under Review	Comp 15
The Apple's Core: Part I	The Professor/Computerre	5+	Still Under Review	Comp 19
The Apple's Core: Part II	The Professor/Computerre	5+	Still Under Review	Comp 21

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

Comp 23

COMPUTER LITERACY

DESCRIPTION

Title: Computer Literacy
Author: None cited
Publisher: Control Data Corp.
Source: P.O. Box 261127, San Diego, Ca., 92126
Subject: Computer Literacy
Topics: Computer history, issues and uses
Components: 1 disk, user's manual (88p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Atari 800, TI 99/4A

Version: 1982
Display Language: English
Cost: $45.00 U.S.(1983)
Tel. #: (714) 233-3784
Users : Upper Elementary +

OBJECTIVES

This program is designed to provide students with basic information about computers and in so doing increase the student's awareness of computers in science, industry and society.

PEDAGOGICAL CONTENT DESCRIPTION

Six programs are accessible through the main menu:

1. REVIEW INSTRUCTIONS: This program is automatically entered when the disk is booted. It provides an orientation to the use of keyboard functions and a review of topics to be covered.

2. EXAMPLES OF COMPUTER USE: The four major components of a computer (CPU, memory, input devices and output devices) are discussed and examples of computer applications in business, science, word processing and manufacturing are presented.

3. LIMITATIONS OF COMPUTERS: The user is presented with twelve situations and is asked if computer involvement in the situation is 1) obvious and easy; 2) possible but difficult; or 3) a harebrained scheme.

4. THE NATURE OF COMPUTERS: To reinforce the notion that a computer can only perform the instructions which it is programmed to do, the user, utilizing the principle of IF, THEN and ELSE, is required to move an object across a board without falling into a pit.

5. WHERE COMPUTERS CAME FROM: Paralleling the idea that tools were invented to solve problems and that as problems became more complex tools of greater sophistication evolved, the computer is traced through its evolutionary process via text and animation.

6. HOW COMPUTERS AFFECT US: The impact of computer technology is presented through statements requesting the user to indicate if various sectors of society would or would not benefit from the technology.

Student support materials contained in the 88 page manual include: (1) A list of people with a description of their invention which contributed to the evolution of computers; (2) Hardware developments; (3) Software developments; and (4) Discussion of current trends. An "Evolution of Computers" quiz is included together with an extensive glossary of terms.

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate for the lower end of the target audience; however, coverage is too elementary for adult users. Clarity is excellent. Depth is appropriate for achieving the program's intents of providing an introduction to computers. Since topics are logically sequenced, it is advisable to complete them in order. The support materials are excellent.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of selecting the appropriate topic, hitting the RETURN key to turn pages, and entering textual responses. All questions are presented in a programmed order. Immediate feedback is provided after each response.

INSTRUCTIONAL FORMAT EVALUATION

While student interaction is appropriate for the target audience, it is not very motivating. The questions are appropriate in prompting thought, however their lineal sequence means a student would not use the program repeatedly. The feedback is effective in that it leads the user to the correct answer, however no quantitative feedback is available.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color, graphics, and sound are used in this program. Combination upper and lower case text is presented in standard size.

TECHNICAL CHARACTERISTICS EVALUATION

The graphics and animation are clear and well integrated with the textual material. User-disabled sound is a positive feature. The CTRL-R function does not function properly at the beginning of the program as it returns the user to the menu rather than reviewing the section under consideration. Unfortunately there is no way of leaving the program without powering off.

SUMMATION

The information presented in this program provides a useful introduction to computers and the graphics employed effectively complement the text. The instructional technique employed is not very motivational, however, as the student's role is often that of a page turner.

STATUS

"Computer Literacy" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $45.00 U.S. from Control Data at the address given at the beginning of the report. Control Data's warranty provides for replacement of defective diskettes without charge within a 90 day warranty period.

In Alberta, the product may be purchased from Edupro Softare and Alphatel Computer Products. Contact the companies directly for price and warranty information (see page v. of the preface).

COMPUTER SCIENCE I

DESCRIPTION

Title: Computer Science I
Author: Benjamin McGill
Publisher: Microcomputer Workshops
Source: 225 Westchester Avenue, Port Chester, NY 10573
Subjects: Computer Literacy/Computer Science
Topics: Shuffling techniques, hashing method
Components: 1 disk and backup, teacher's guide (14p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available for Apple only

Version: 1984
Display Language: English
Cost: $29.95 US (1985)
Tel. #: (914) 937-5440
Users: Grades 7 - 12

OBJECTIVES

The stated objective of this program is to teach three different shuffling techniques and one hashing method.

PEDAGOGICAL CONTENT DESCRIPTION

The student can choose from a menu a demonstration of one of three shuffling methods (a technique that takes an ordered list of data and places it in random order without repetition of items) or a hashing method (a process which allows the user to store values of data in condensed form and key in on the location or record where the particular item of data is stored.)

PEDAGOGICAL CONTENT EVALUATION

This program relies heavily on classroom instruction as a background for understanding the processes being demonstrated. While the computer is an appropriate medium for demonstrating the techniques of shuffling and hashing, the lack of explanations, definitions and disk instructions makes the package best suited for use as a teacher demonstration tool. While the various steps in the sorting process are outlined in the print support materials the technique would be difficult for a student to follow from the graphical demonstration alone.

INSTRUCTIONAL FORMAL DESCRIPTION

Student interaction consists of menu selection, speed selection, using any key to advance frames, and occasionally answering Y/N in response to whether (s)he wishes to continue. The programs are designed for demonstration, hence there is no questioning, feedback, or evaluation.

INSTRUCTIONAL FORMAT EVALUATION

This program presents an effective graphical demonstration of sorting and hashing techniques and should provide students with an understanding of simple number crunching manipulative operations. Program controls are consistent, however the disk lacks the necessary explanations, definitions and instructions to enable use as a stand alone instructional unit. The lack of questions, feedback and evaluation further inhibit individual student use. Support documentation must be read carefully in order to maximize the effectiveness of the disk.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses large, block numbers for the demonstration of the sorting routines. Text is presented in combination upper/lower case with windowing and overwriting used to change the value of numbers. Inverse highlighting is used for emphasis. Neither color nor sound are used.

TECHNICAL CHARACTERISTICS EVALUATION

The disk is user friendly and bomb proof. Screens are well formatted, and the use of large size text makes the material easy to read on either monochrome or color monitors. The option for a student to exit at any time via the escape key is good.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The fourteen page guide includes program objectives, program descriptions, and a printout of each program's commands together with an explanation of line statement functions.

IMPLEMENTATIONAL SUPPORT EVALUATION

Students would need to have copies of the guide before them in order to understand the demonstration process they are observing. Also, all operating instructions are given in the appendix of the guide as opposed to being on the disk itself. While the guide does include line by line explanations of the BASIC computer program which operates each demonstration, it does not include any questions to test student understanding of the process.

SUMMATION

This program makes effective use of the computer medium to present a graphical depiction of sorting and hashing processes and, as such, is useful as a teacher demonstration tool. Its classroom potential could be vastly improved if the demonstration was expanded into an interactive teaching program.

STATUS

"Computer Science I" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 (U.S.) (1985) from Microcomputer Workshops at the address given at the beginning of the report. A backup may be purchased for an additional $5.00 U.S. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshops products are carried by Edupro Software. Contact the company directly for availability, price and warranty information (see page v. of the preface).

DATABASES

DESCRIPTION

Title: Databases
Series: Computer Concepts
Author(s): Continuous Learning Corp. and Control Data Corp.
Publisher: Control Data Publishing
Source: c/o Control Data Canada Ltd, #1210 10303 Jasper Ave, Edmonton, AB T5J 3N6
Subjects: Computer Literacy
Topics: Introduction to databases, applications of databases
Components: 2 disks, teacher's guide (47p.), user's guide (33p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer (Optional)
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: not stated
Tel. #: (403) 423-5030
Users: Grades 7 - 12

OBJECTIVES

As a result of using this disk, students will be able to:

1. Define and indentify information, input, data, databases, records and fields.
2. Recognize the applications of data bases and database searches.
3. Initiate searches of existing databases.
4. Work with data entered into databases and with databases encountered in everyday life.

PEDAGOGICAL CONTENT DESCRIPTION

The thirteen lessons contained on the two disks in this package constitute an introductory tutorial to the study of databases. Each section contains definitions (information, data, input, records, fields, etc.), example problems, and interactive screens.

PEDAGOGICAL CONTENT EVALUATION

Content range is appropriate for an introduction to the concept of databases. It presents fundamental definitions logically, simply, and with enough example support to ensure understanding. While content depth is appropriate for Junior High students, topic coverage in some sections is irritatingly repetitive and may be too simplistic for a high school audience. More depth with more sophisticated examples would improve the quality of learning for senior students.

The program offers logical sequencing beginning with simple definitions and proceding to more complex examples.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of lesson selection from the menu, using RETURN to advance frames, and inputting words in response to pre-ordered questions. Positive feedback consists of a short congratulatory phrase; negative feedback consists of a message such as "That is incorrect, try again." After two incorrect attempts the user is given the correct answer. A help screen provides a restatement of the definitions required to answer the questions.

This program does not offer quantitative feedback nor is provision for review incorporated. The user has control of initial sequence selection and rate; within a lesson, sequence and amount are program controlled.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate for the target audience. The tutorials are easy to follow and provide logical instruction if completed in order. Questions are presented in fixed order, and although they allow students the opportunity of entering data and having it formatted, they unfortunately do not provide the opportunity of manipulating or experimenting with it, both of which would create an increased interest level. The instructional strength of the program could be improved by incorporating branching for review and including an evaluation to assess student learning.

Methods of control are satisfactory.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program is done in high-resolution graphics with larger than normal text size. Color is used for emphasis. Sound is not used.

TECHNICAL CHARACTERISTICS EVALUATION

The use of high-resolution graphics produces very readable text; however, at the same time, it results in frustrating waits while the disk interacts to load each program. Screens are well formatted and uncluttered. Excellent on-screen prompts make the program easy to use.

Students found the line-by-line presentation of text very annoying.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The 33 page user's guide provides an introduction to computers, a summary of each program module, brief student activities, and a glossary. The accompanying teacher's guide provides an overview of each of the programs contained in the "Computer Concepts" series. It includes a guide to the use of the computer, a statement of purpose, a summary of each module in the series, brief teaching strategies, user materials for each unit, a glossary, and suggestions for integration into the curriculum.

This program does not offer a management system.

IMPLEMENTATIONAL SUPPORT EVALUATION

User support materials are comprehensive and should enable use of the program by users with little or no computer background. The teacher's manual contains only one short matching exercise as a test for evaluating student performance. More evaluation exercises would be desirable.

SUMMATION

This package tackles a potentially complex subject and provides instruction in a simple and logical fashion thus achieving its objective of offering an introduction to databases for beginning students.

STATUS

"Databases" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased from Control Data Corporation at the address given at the beginning of the report. Pricing and warranty information was not available at publication.

In Alberta, Control Data products are sold by Alphatel Computer Products and Edupro Software. Contact the companies directly for availability, price and warranty information (see page v. of the preface).

MICROS MADE EASY

DESCRIPTION

Title: Micros Made Easy
Author: Ann Bishop
Publisher: Science Research Associates
Source: 707 Gordon Baker Rd., Willowdale, ON M2H 2S6
Subject: Computer Literacy
Topics: Keyboarding, computer parts and functions, programming
Components: 3 disks, user's guide (35p.)
System Requirements: Appple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): IBM PC

Version: 1983
Display Language: English
Cost: $210.00 (1985)
Tel. #: (416) 497-7707
Users: Grade 4+ (Inferred)

OBJECTIVES

As a result of using this package, students will:

1. Be given an introduction to microcomputers, their components and their capabilities.
2. Have an elementary exposure to programming.

PEDAGOGICAL CONTENT DESCRIPTION

The three disks in this package contain six programs:

1. INTRODUCTION - covers the use and function of the RETURN and RESET keys, provides a brief explanation of input/process/output, discusses computer components, and provides an example of menu selections.

2. KEYBOARDING - introduces keyboard locations by having the user press highlighted keys. Shift key operation is explained and the differences between "1" and "L" and "zero" and "O" are discussed.

3. LEARNING ABOUT YOUR COMPUTER - discusses and provides examples of the capabilities of the computer (interaction, graphics, animation, calculation, memory, color, sound, etc.).

4. THE PARTS OF YOUR COMPUTER - explains the parts of the computer in relation to input, output and processing. A review and game are also included.

5. PECKING AWAY AT PROGRAMMING - contains six lessons which outline basic principles of programming such as accuracy, structure, sequence, conditions, etc. (The students use basic commands to control the movements of Omletta, the chicken.)

6. Basic BASIC - presents 13 lessons which cover the elements of programming in the BASIC language and includes such commands as Print, Let, Input, GoTo, If...Then, For...Next, and Read...Data.

Most of the programs contain information screens followed by interactive screens that allow the user to respond to questions pertaining to the lesson's concepts.

PEDAGOGICAL CONTENT EVALUATION

Content is well sequenced in small incremental steps and sufficient depth is present to meet the objectives of providing an introduction to computer literacy. Explanations are clear, straight-forward, and interesting. The weakest program in the series is "Keyboarding" as it presents key locations only with no instruction re. technique, finger usage, etc. Although the target audience is not specified, content range appears to be most appropriate for upper elementary/lower junior high.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, using the RETURN key to advance frames, and keying in words or phrases. Questions are presented in a pre-programmed order and immediate textual feedback is provided after each user response. Generally two incorrect responses are allowed before the correct answer is given. The programs do not offer evaluation or branching for review. The user initially selects the sequence and has control of rate at all times; within a lesson, both sequence and amount are program controlled.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is consistent and appropriate for the target audience. Feedback is generally good as incorrect answers are usually accompanied by an explanation. The types of control are effective, however it is impossible to advance quickly through a program to a desired point or to backpage for review.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution generation is used for text and graphics. Color and sound are occasionally used both as part of the explanation and the feedback.

Because the program is highly disk interactive, it is limited to use by one student at a time.

TECHNICAL CHARACTERISTICS EVALUATION

Screen displays are well formatted and appropriate for the target audience. Graphics are effectively used to show the inner workings of the computer. Since the program is written for the II+ keyboard, slight variations are encountered for the IIe which are not explained on the disk (e.g. the keyboard diagram varies slightly, the caps lock must be depressed on the IIe, etc.).

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The thirty five page guide included with this package contains textual descriptions of the program contents, outlines learning goals for each program and provides basic computer operational instruction.

IMPLEMENTATIONAL SUPPORT EVALUATION

The user's guide is well organized and should be helpful in providing teachers with an overview of the contents of the disks as well as providing some background information to support the disk contents.

SUMMATION

The content of this package provides a basic introduction to computer literacy in a manner which is non-threatening to a novice. Sequence is logical, however the attempt to appeal to a broad target audience means that some sections will be too juvenile in presentation mode (e.g. Omletta, the chicken, is beneath the dignity of a junior high class) while others are beyond the lower target audience's range (e.g. "Basic BASIC" is geared to a grade 6+ audience).

STATUS

"Micros Made Easy" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $210.00 (1985) from Science Research Associates at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Subsequently diskettes which become inoperable through normal use may be replaced for $20. No time limit is given for this warranty.

SORTING TECHNIQUES I

DESCRIPTION

Title: Sorting Techniques I
Author: None Cited
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, NY 10573
Subject: Computer Literacy
Topics: Bubble sort, selection sort, insertion sort, shell sort, quick sort
Components: 1 disk, user's guide (7p.)
Additional Hardware/Software Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred.
Other Formats Available (not evaluated): Available in Apple format only.

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1985)
Tel. #: (914) 937-5440
Users: High School+

OBJECTIVES

This disk is designed to provide students with an understanding of how different sorting techniques work by graphically displaying the sort in a step-by-step manner.

PEDAGOGICAL CONTENT DESCRIPTION

The five programs on this disk visually depict five different sorting techniques: BUBBLE SORT, SHELL SORT, SELECTION SORT, INSERTION SORT and QUICK SORT. These sorts are presented not only in order of increasing efficiency of the technique but also in order of the increasing complexity of the algorithm. The same sorting model is used for each program: ten large block numbers, randomly generated, are sorted using the particular sort process under consideration. For each program the user has the option of choosing "Lesson" (which explains the sort in a step-by-step graphic fashion with the user controlling the pace via the space bar) or "Fast" (which presents a computer-paced graphical demonstration of the sort).

PEDAGOGICAL CONTENT EVALUATION

The range and depth of content are appropriate as an introduction to sorting techniques in BASIC and could be effectively used as a teacher demonstration. While the programs are arranged in an ascending order of sorting efficiency as well as in algorithm difficulty, this is not apparent from use of the disk alone. It is clearly outlined in the accompanying support materials however. The user must likewise depend upon the support documentation's textual explanations of the sorting techniques as it would be unlikely that a complete understanding would result from use of the disk's graphical demonstration alone.

An inconsistency was noted between the hard copy program listing and the screen listing in that, while referenced steps are the same, different line numbers are used which proves confusing.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, program speed selection, using any key to advance frames, and using ESCAPE to exit from a lesson. The programs are designed as a demonstration only--each program randomly generates ten numbers and sorts them according to the particular formula under consideration. Questioning, evaluation, feedback or branching for review are thus not part of this program. Sequence and rate are controlled by the user; however, amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

This program is effective in providing a graphical demonstration of sorting techniques; however, since the user is simply a passive observer to the process, the danger of lack of concentration is very real (especially in the demonstration of more complex routines such as "Quick Sort"). User instructions for program controls are clear and consistent.

Total disk effectiveness could be greatly enhanced if the textual explanations presented in the support documentation were included on the disk itself.

TECHNICAL CHARACTERISTICS DESCRIPTION

The program uses large, block numbers for the demonstration of the sorting routines. Text is presented solely in uppercase with inverse highlighting used for emphasis. Limited use is made of color and no sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

Screen layout is well designed and inverse highlighting is effectively used both for emphasis and to aid in following the execution sequence. The use of color in one program is advantageous and should be expanded to all the programs. User control instructions are consistently placed at the bottom of the screen. While the user is appropriately given the option of viewing a demonstration again via a Y/N choice, accidentally pressing any key other than the "Y" or "N" will result in the program being repeated. This is undesirable.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A seven page reproducible teacher's guide provides a detailed description of the program operation including a general written description of how the sort works followed by a program listing explaining each step in the program. The guide also devotes a section to comparing the efficiency and complexity of each sorting algorithm.

IMPLEMENTATIONAL SUPPORT EVALUATION

It is imperative that users read the documentation thoroughly in order to obtain a clear understanding of the graphically displayed sorting steps.

SUMMATION

This program makes effective use of the computer medium to present a graphical depiction of various sorting processes.

STATUS

"Sorting Techniques I" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1985) from Microcomputer Workshops at the address given at the beginning of the report. A backup may be purchased for an additional $5.00 U.S. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshops products are carried by Edupro Software. Contact the company directly for availability, price and warranty information (see page v. of the preface).

SORTING TECHNIQUES II

DESCRIPTION

Title: Sorting Techniques II
Author: None Cited
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, NY 10573
Subject: Computer Literacy
Topics: Sorting techniques, heap sort, link sort, binary sort, shaker sort
Components: 1 disk, user's guide (7p.)
Additional Hardware/Software Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred.
Other Formats Available (not evaluated): Available in Apple format only.

Version: 1983
Display Language: English
Cost: $29.95 U.S.(1985)
Tel. #: (914) 937-5440
Users: High School+

OBJECTIVES

This disk is designed to provide students with an understanding of how different sorting techniques work by graphically displaying the sort in a step-by-step manner.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains four programs: HEAP SORT, LINK SORT, SHAKER SORT AND BINARY SEARCH. The first three programs graphically depict different sorting routines; "Binary Search" shows how searches can be performed on items that are already sorted by sequence (i.e. the computer searches for a single number inputted by the user from a given matrix of 45 numbers). For each program, the user has the option of choosing "Lesson" (which explains the sort in a step-by-step graphic fashion with the user controlling the pace via the space bar) or "Fast" (which presents a computer-paced graphical demonstration of the sort).

PEDAGOGICAL CONTENT EVALUATION

The range and depth of content are not appropriate as an introduction to sorting techniques; however, the disk would be useful in an advanced course in BASIC. Each program can be studied at a single sitting, but the lack of disk instruction dictates that these programs would be best used as teacher demonstration tools. (The various steps in the sorting algorithm are outlined in the print support materials, but the sorting techniques would be difficult for a student to follow from the graphical demonstration alone).

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, program speed selection, using any key to advance frames, inputting numbers for a search, and using ESCAPE to exit from a lesson. The programs are designed as a demonstration only. "Heap Sort" and "Shaker Sort" randomly generate numbers and sort them according to the particular formula under consideration; "Link" and "Binary Search" ask the user for number input with which to perform the sort. As the programs are intended only to visually demonstrate the various sorting techniques, there is no questioning or evaluation employed. Feedback is limited to a message in "Binary Search" which states whether or not an inputted number is in the list of 45 computer generated numbers.

Sequence and rate are controlled by the user and amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

This program is effective in providing a graphical demonstration of sorting techniques; however, since the user is simply a passive observer to the process, the danger of lack of concentration is very real (especially in the demonstration of more complex routines). User instructions for program controls are clear and consistent but the support documentation must be read carefully in order to maximize the effectiveness of the disk. (Total disk effectiveness could be greatly enhanced if the textual explanations presented in the support documentation were included on the disk itself.)

TECHNICAL CHARACTERISTICS DESCRIPTION

The program uses large, block numbers for the demonstration of the sorting routines. Text is presented in combination upper/lower case with inverse highlighting used for emphasis. Neither color nor sound are used.

TECHNICAL CHARACTERISTICS EVALUATION

Screen layout is well designed and inverse highlighting is effectively used both for emphasis and to aid in following the execution sequence. The use of color in one program is advantageous and should be expanded to all the programs. User control instructions are consistently placed at the bottom of the screen. While the user is appropriately given the option of viewing a demonstration again via a Y/N choice, accidentally pressing any key other than the "Y" or "N" will result in the program being repeated. This is undesirable.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

An eleven page reproducible teacher's guide provides a detailed description of the program's operation including .a general written description of how each sort works followed by a program listing explaning each step. The guide also devotes a section to comparing the efficiency and complexity of each sorting algorithm.

IMPLEMENTATIONAL SUPPORT EVALUATION

It is imperative that users read the documentation thoroughly in order to obtain a clear understanding of the graphically displayed sorting steps.

SUMMATION

This program makes effective use of the computer medium to present a graphical depiction of various sorting processes. The lack of student interaction makes it most suitable for a teacher demonstration tool rather than for individual student study.

STATUS

"Sorting Techniques II" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1985) from Microcomputer Workshops at the address given at the beginning of the report. A backup may be purchased for an additional $5.00 U.S. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshops products are carried by Edupro Software. Contact the company directly for availability, price and warranty information (see page v. of the preface).

SPECTRUM: PATTERNS & PROGRAMS

DESCRIPTION

Title: Spectrum: Patterns and Programs
Author: Stephen Shalom
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subjects: Computer Literacy, Problem Solving
Topics: Discovering patterns, programming logic, building skills in writing programs
Components: 1 disk with backup, teacher's guide (34p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor optional
Other Formats Available (not evaluated): TI 99/4A

Version: 1984
Display Language: English
Cost: $55.00 US (1984)
Tel. #: (914) 769-5030
Users: Grade 6+

OBJECTIVES

As a result of using this program students will be able to:

1. Find order and discover patterns.
2. Practice following the logic of simple programs.
3. Build skills in writing simple computer programs.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains two programs:

PLAY A GAME - The user, playing at one of nine difficulty levels, attempts to determine a hidden pattern of bars of either colors or shapes with as few clues as possible. Once the user has discovered the pattern, (s)he attempts to match it either by listing the pattern bar by bar or by writing a pattern generating program.

CREATE A PATTERN - This program allows the user to write a hidden program or pattern either for practice or to challenge other players.

Each game can be played individually or in small groups.

PEDAGOGICAL CONTENT EVALUATION

The activities on this disk promote the development of logic and inductive reasoning. Instructions are generally easily understood, however teachers may need to assist younger students with the instructions for loop statements. The nine playing levels offer good range, and the incremental increases in difficulty levels provide students with a structured learning sequence as each stage lies within certain parameters (e.g.the number of repetitions, the degree of randomness, the locations of random features, and the number of colors or symbols used.) An unlimited number of patterns can be created.

Although there are nine levels, their parameters can extend across levels. Thus, although a student has selected level 3, it may occur that the puzzle (s)he is given is a level 1 problem. This can be advantageous as students are not able to predict - 'this is level 3, therefore the puzzle has to be of this type'. However, there are also a number of disadvantages. Trial runs at the lower three levels resulted in a heavy preponderance of level 1 problems only. Also, a student may feel it unfair when a competitor receives an obvious pattern and (s)he is given a much more complicated one to solve. (The scoring system, however, does counter this somewhat.) This situation could be solved if a round consisted of more than one puzzle to solve. Although, students can choose to play again, the start up procedure has to be repeated and this can be frustrating. Having the user determine the number of puzzles to be posed at the beginning of the game could alleviate both problems of range of difficulty and lack of depth of one sitting. Allowing students to play at varying levels of difficulty would also enhance the game (i.e. one student plays at level 3, another at level 6).

Since the "Instruction" program should be viewed first, it may be more appropriate to list it on the menu as program one rather than as program three.

The clarity of the loop statement (F1*9) would be improved if the instructions clarified that "F1" means from FROM PROGRAM LINE NUMBER 1 as opposed to FROM BAR NUMBER 1. This is not really clear until the student faces problems of trying to enter loops that start at bar #12 but line #5.

The content would likely be best suited to a grade 7-10 audience.

INSTRUCTIONAL FORMAT DESCRIPTION

Via menu selections, students choose a program and then enter their name and desired difficulty level (this can also be teacher controlled). Thereafter, students input numbers, letter symbols for colors, RETURN, or one or four letters representing a computer instructional command. Notetaking is usually required and reproducible forms are provided. Patterns are randomly chosen and clues are provided when they are requested by the user. Incorrect entries are either not accepted or are acknowledged with a phrase such as "Error. Try again". Partly correct answers receive a message listing how many tries the student made, the number right and wrong, and any inconsistencies that should have been caught. A totally correct response provides a burst of beeps and the message "You Got It!" The user is then shown the program which was used to write the pattern.

The student has total control of rate, sequence and amount. In addition, the teacher can control the difficulty levels and can define the pattern generating program and thus limit student access.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate for the target audience. Entries can be corrected provided that the RETURN key has not be pressed. The manipulation of programs and patterns promotes the inquiry method of thinking and meets the package objectives of developing pattern recognition skills and logical thinking skills. Feedback is appropriate and the help provided via clues is indispensable. The fact that the program used to write the pattern is displayed after a student's successful attempt is a strength as it invites students to compare the conciseness of the computer-generated program with their own. Motivation and interest run high provided the student has chosen the correct degree of playing difficulty. (The fact that teachers can custom tailor the level of difficulty to the needs of the audience is a definite strength.)

Feedback for incorrect errors is somewhat limited. It would be preferrable to have some explanation or hint available as to why a particular entry was wrong.

The score provided at the end of the program is effective in maintaining student interest; however, since most students would be unaware of the factors influencing it, a continuous running score reflecting the results of each student input may be more motivational.

TECHNICAL CHARACTERISTICS DESCRIPTION

The graphics used in this program can be run on a color monitor, or, if a monochrome monitor is used, color patterns will be replaced by a variety of shapes. Sound, consisting of a variety of buzzes and beeps, accompanies each input, however the teacher can elect to disable it. A variety of high resolution print sizes are used depending upon the available space. Provided access to the instructions are not required, the disk can be removed from the disk drive and program operation can be continued.

TECHNICAL CHARACTERISTICS EVALUATION

Print size is appropriate. Color is used effectively and can be adjusted at the beginning of the program for good balance. The fact that sound can be teacher disabled is an advantage as sound would likely prove distracting in a classroom setting. The fact that the program generator requires over a minute to produce a pattern at advanced difficulty levels can prove frustrating.

Entering a program listing can be somewhat difficult as the student can not see any previous lines. This is caused by the necessity to keep the bar display on the screen and there is only one line at the bottom of the screen to work with. However, as the entire bar does not have to be seen, a split screen technique could be used so that the entire pattern as well as the full program listing could be shown.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The 28 page teacher's guide includes objectives, game details, program rules and allowable statements, scoring techniques, a description of teacher options and game strategies, and suggestions for classroom use. Student support materials include a student record sheet and a game plan worksheet.

IMPLEMENTATIONAL SUPPORT EVALUATION

The teacher's documentation is thorough and well laid out. The option of being able to restrict students to a certain program has the potential value of insuring that all students in a class work on the same problem; however, it is very time consuming for the teacher to then select another program, especially if this needs to be done at each terminal.

The student game plan sheet is effective in strategy planning.

SUMMATION

This package presents effective drill designed to develop pattern recognition, prediction, logic, inductive reasoning and program writing skills. Strengths include the sequence of difficulty, the teacher control of features, the motivation of the game format and the ability of students to enter their own patterns. Weaknesses include the lack of helpful feedback for students having difficulty, the necessity to go through start-up procedures to play again, the inability to see the entire program listing as it is created and the long delays when high difficulty patterns are created.

The overall quality of the package is good - students will generally find the programs motivational and learning will take place that impacts in both computer literacy ad problem solving areas.

STATUS

"Spectrum: Patterns and Programs" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $55.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, Sunburst products are carried by Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

THE APPLE'S CORE: PART I

DESCRIPTION

Title: The Apple's Core: Part I
Authors: Not available
Publisher: The Professor/Computerre
Source: c/o Computerre, P.O. Box 782, St Laurent, Quebec H4L 4W2
Subject: Computer Literacy
Topics: Beginning programming in Applesoft Basic
Components: 2 disks, user's guide (40p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor optional
Other Formats Available (not evaluated): Available in Apple format only; A French version also available

Version: 1982
Display Language: English
Cost: $69.95 (1985)
Tel. #: (514) 744-1608
Users: Grade 5+

OBJECTIVES

As a result of using this disk, students will be able to:

1. Operate/manipulate an Apple II computer and disk drive.
2. Use DOS operating commands.
3. Write simple programs in the Applesoft language involving the BASIC commands of PRINT, LET, GOTO, IF/THEN, INPUT, READ/DATA, FOR/NEXT and GOSUB.

PEDAGOGICAL CONTENT DESCRIPTION

This package provides an introduction to the Apple II family of computers and the Applesoft version of BASIC. It begins with an introduction of "What can a computer do?". This is followed by a lesson on order of operations, variable names, storage, and reserved words. Thirteen modules then guide the students through PRINT statements, INPUTS, LOOPS, and GOSUBS.

Each lesson follows an identical 3 stage format:

1. A lesson is presented on the screen.
2. Students are guided through a tutorial set of programs which involve use of both the computer and the manual.
3. The student enters a program from the manual and alters or edits it in application of the concepts taught in the lesson.

PEDAGOGICAL CONTENT EVALUATION

This package offers a strong complement to a teacher's classroom presentation of beginner's BASIC. The program is logically sequenced with appropriate interspersions of lessons and tutorials. When both disks are used conjunctively (i.e. the program lessons and the corresponding tutorials), good depth is available via detailed explanations, examples and ample opportunity for practice. Information is presented in a logical and clear manner, although the level of vocabulary is best suited to a junior high plus audience. User support materials are an essential adjunct to the tutorials and they require careful reading and precise following of directions.

Concerns with program content include the fact that:

1. Some evaluators thought the practice of putting more than one statement on one line was inappropriate for a beginning BASIC tutorial
2. Many of the programs supplied with the package do not illustrate the principle of structured programming.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction on the program disk consists of entering module selection numbers, typing RUN or LIST, and using the space bar to advance frames. The tutorial programs invite the user to enter programs into the computer from the listing in the manual and modify them in accordance with given instructions. Neither disk offers questions, evaluation, or branching. Program sequence and rate are user controlled; amount is program controlled.

This program offers only one type of feedback--the "Easy-Type" system. Under this system, both the manual and the program tell the user exactly what to enter from the keyboard. If the user hits a wrong key the program responds with a buzzing sound and waits for the correct letter, number or symbol to be entered before continuing.

INSTRUCTIONAL FORMAT EVALUATION

The instructional techniques utilized on the program disk consists largely of reading and page turning, and this combined with the mature vocabulary used may make the disk best suited to highly motivated students. The interactive nature of the tutorial disk is more conducive to developing critical thinking skills. The programs are devoted primarily to teaching syntax rather than to teaching actual programming skills.

The EASY-TYPE system employed in this program is a strength as "errorless" typing helps overcome programming frustrations and is especially helpful for students with poor or no keyboarding skills.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses high resolution graphics to display large print, combination upper/lower case lettering when emphasis is required. Reverse video and scrolling are used to focus on important information. Color is used to demonstrate the capabilities of the computer.

TECHNICAL CHARACTERISTICS EVALUATION

This disk is designed to provide individualized instruction and can be used by a person with minimal computer competency. This program uses color, graphics and sound effectively. Good use is made of various instructional techniques (flash, inverse, larger type, pointers, etc.) to draw attention to important concepts. The graphics style of text presentation is used very effectively both to show the insertion of lines or program changes and to trace the logic path through a program via flowlines, thus stressing the cause-effect relationship.

The program effectively provides a continuation option for students leaving midway through a module. All programs are relatively boomproof under normal use.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The tutorial disk is designed to be used in conjunction with the 40 page user's manual which contains 32 sample programs related to those contained on the disk and it provides explanations related to the flow of these programs.

IMPLEMENTATIONAL SUPPORT EVALUATION

The user support materials tend to be wordy and not especially motivating. These are clearly designed for the upper levels of the target audience. It is imperative that the manual, program disk and tutorial disk be used as an integrated package to enable effective learning to take place.

SUMMATION

This package is a good instructional guide to beginning computer programming for a student with above average skills in reading and comprehension. All three parts of the program (i.e. two disks and manual) must be used in conjunction with one another for effective learning to take place.

STATUS

"The Apple's Core: Part I" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $69.95 (1985) from Computerre at the address given at the beginning of the report. This package is part of a two part series - the series may be purchased for $139.95 (see "The Apple's Core: Part II"). The company provides an unlimited lifetime warranty on disks with no charge for replacements.

THE APPLE'S CORE: PART II

DESCRIPTION

Title: The Apple's Core: Part II
Author: Not available
Publisher: The Professor/Computerre
Source: c/o Computerre, P.O. Box 782, St Laurent, Quebec H4L 4W2
Subject: Computer Literacy
Topics: Intermediate programming in Applesoft Basic
Components: 2 disks, user's guide (40p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor optional
Other Formats Available (not evaluated): Available in Apple format only; A French version is also available

Version: 1983
Display Language: English
Cost: $83.95 (1985)
Tel. #: (514) 744-1608
Users: Grade 5+

OBJECTIVES

As a result of using this disk, students will become familiar with the use of the following Applesoft Basic commands: TAB, HTAB, VTAB, SPC, NORMAL, FLASH, INVERSE, TRACE, SPEED, RND, COS, INT SQR, READ, DATA, RESTORE, VAL, LEN, LEFT$, RIGHT$, MID$, GET, ONE, GOTO, AND, OR, POKE, and PEEK.

PEDAGOGICAL CONTENT DESCRIPTION

This package contains two disks, a program disk and a tutorial disk. There are 13 modules on the program disk, each of which has supporting application type problems on the tutorial disk (used in conjunction with the user's guide). The topics are:

1. Screen size, VTAB and HTAB.
2. TAB & SPC, NORMAL, INVERSE & FLASH.
3. Editing using ESC, I, J, K, and M keys.
4. Low and High resolution graphics, TEXT, GR, and PLOT.
5. HPLOT, HGR, HCOLOR.
6. RND.
7. SIN, COS, TAN, LOG, INT, ABS, SQR, and SGN.
8. READ, DATA, Out of Data Error.
9. Simple Arrays.
10. String Variables.
11. GET, And, OR, ON, GOTO, GOSUB.
12. PEEK, CHR$.
13. SAVE, LOAD, CATALOG, LOCK, CTR, OPEN, WRITE, CLOSE.

Each lesson follows an identical 3 stage format:

A. A lesson is presented on the screen via the program disk.
B. Students are guided through a tutorial set of programs which involve use of both the computer and the manual.
C. The user enters a program from the manual and alters it in application of the concepts taught in the lesson.

PEDAGOGICAL CONTENT EVALUATION

This package offers a strong complement to a teacher's classroom presentation of intermediate BASIC. The program is logically sequenced with appropriate interspersions of lessons and tutorials. When both disks are used conjunctively (i.e. the program lessons and the corresponding tutorials), good depth is available via detailed explanations and examples and ample opportunity for practice. Information is presented in a logical and clear manner, although the level of vocabulary and the sophistication of commands used definitely imply a junior high/high school audience. User support materials are an essential adjunct to the tutorials and they require careful reading and precise following of directions.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction on the program disk consists of entering module selection numbers and using the space bar to advance frames. The tutorial programs invite the user to enter programs into the computer from the listing in the manual and modify them in accordance with given instructions. Neither disk offers questions, evaluation or branching. Program sequence and rate are user controlled; amount is program controlled.

The disks do not provide any questioning, however some rhetorical questions are asked in the user's guide.

Feedback in the program is limited to the error messages provided when working with Applesoft BASIC and the "beeps" used to signify incorrect entries in the "Easy-Type" system. (Under this system, both the manual and the program tell the user exactly what to enter from the keyboard. If the user hits a wrong key the program responds with a buzzing sound and waits for the correct letter, number or symbol to be entered before continuing.)

INSTRUCTIONAL FORMAT EVALUATION

The instructional techniques utilized on the program disk consists largely of reading and page turning, and this, combined with the mature vocabulary used, may make the disk best suited to highly motivated students. The interactive nature of the tutorial disk is conducive to developing critical thinking skills and the amount of student learning that would take place would probably increase with maturity and age.

It is unfortunate that this program does not incorporate any form of evaluation. There are no pre- or post-tests nor is there any measure of the students' achievements other than the self-evaluation done by the user.

The EASY-TYPE system employed in this program is a strength as "errorless" typing helps overcome programming frustrations and is especially helpful for students with poor or no keyboarding skills.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses high resolution graphics to display large print, combination upper/lower case lettering when emphasis is required. Reverse video and scrolling are used to focus on important information. Color is used to demonstrate the capabilities of the computer.

TECHNICAL CHARACTERISTICS EVALUATION

This disk is designed to provide individualized instruction and can be used by a person with minimal computer competency. This program uses color, graphics, and sound effectively. Good use is made of various instructional techniques (flash, inverse, larger type, pointers, etc.) to draw attention to important concepts. The graphics style of text presentation is used very effectively both to show the insertion of lines or program changes and to trace the logic path through a program via flowlines, thus stressing the cause-effect relationship.

The program effectively provides a continuation option for students leaving midway through a module. All programs are relatively boomproof under normal use.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The tutorial disk is designed to be used in conjunction with the 40 page user's manual which contains 32 sample programs related to those contained on the disk and it provides explanations related to the flow of these programs.

IMPLEMENTATIONAL SUPPORT EVALUATION

The user support materials tend to be wordy and not especially motivating. There are clearly designed for the upper levels of the target audience. It is imperative that the manual, program disk and tutorial disk be used as an integrated package to enable effective learning to take place.

SUMMATION

This package is a good instructional guide to intermediate computer programming for a student with above average skills in reading and comprehension. All three parts of the program (i.e. two disks and manual) must be used in conjunction with one another for effective learning to take place.

The disk would be an effective enrichment/remedial method of individualizing instruction in the classroom.

STATUS

"The Apple's Core: Part II" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $83.95 (1985) from Computerre at the address given at the beginning of the report. This package is part of a two part series - the series may be purchased for $139.95 (see "The Apple's Core: Part I"). The company provides an unlimited lifetime warranty on disks with no charge for replacements.

COMPUTER LITERACY/SCIENCE TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
APPLIED MICROSYSTEMS	BEGINNING BASIC	0.0	40
AV SYSTEMS	BASIC TEACHER	1984.0	41
BUCCANEER SOFTWARE	THE HELPING HAND	1984.0	41
CHARLES MANN	TEACHER PLUS	0.0	60
CLASSROOM COURSEWARE COMPANY	LEARN BASIC	0.0	60
COMPUTER SYSTEMS & RESEARCH INST.	LOGIC LAB	0.0	60
CONTINENTAL PRESS	COMPUTER LITERACY: AN INTRODUCTORY COURSE	0.0	40
CONTROL DATA PUB	FILES AND EDITING	1983.0	41
CONTROL DATA PUB	STORAGE AND MEMORY	1983.0	41
CONTROL DATA PUB	THE COMPUTER KEYBOARD	1983.0	41
DENVER SOFTWARE COMPANY	PASCAL TUTOR	1981.0	40
EDUCATIONAL ACTIVITIES	ACCUTOUCH	0.0	60
EDUCATIONAL COURSEWARE	BASIC TUTOR SERIES	0.0	40
EDUCATIONAL TEACHING AIDS	RUN ROBOT RUN	0.0	40
ENCYCLOPAEDIA BRITANNICA	COMPUTERS IN THE WORKPLACE	1984.0	41
ENCYCLOPAEDIA BRITANNICA	PROGRAMMING YOUR APPLE	1984.0	41
ENCYCLOPAEDIA BRITANNICA	UNDERSTANDING COMPUTERS	1983.0	41
FOCUS MEDIA	THE BASICS OF BASIC	1983.0	41
GROLIER EDUCATIONAL ASSOCIATES	GRAPHMASTER	1984.0	41
GROLIER EDUCATIONAL ASSOCIATES	INFORMASTER	1984.0	41
HAYDEN SOFTWARE	HOW TO PROGRAM IN APPLESOFT BASIC	0.0	40
HOUGHTON MIFFLIN	INTRODUCTION TO APPLE II BASIC	1984.0	41
INFORMATICS SOFTWARE	BASIC PROGRAMMING	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	BUSINESS APPLICATIONS	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	BUSINESS FORCASTING	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	COMPUTER AS A CALCULATOR	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	COMPUTER GRAPHICS	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	COMPUTER SIMULATION	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	INTRODUCTION TO THE COMPUTER	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	PRINTER	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	STATISTICS	0.0	60
INNOVATIVE PROGRAMMING ASSOCIATES	USES OF A DATABASE	0.0	60
INTELLECTUAL SOFTWARE	DATA BASE JR.	1983.0	41
KNOWARE	KNOWARE	0.0	60
LAWRENCE HALL OF SCIENCE	CREATIVE PLAY	1982.0	42
LOVE PUBLISHING	COMPUTER LITERACY 1: MACHINE	0.0	60
LOVE PUBLISHING	COMPUTER LITERACY 2: USE	0.0	60
LOVE PUBLISHING	COMPUTER LITERACY 3: APPLICATIONS	0.0	60
MCGRAW HILL	INTRODUCTION TO MICROCOMPUTERS	1982.0	41
MEDIA MATERIALS	COMPUTER TALK	1983.0	41
MEDIA MATERIALS	COMPUTER TERMS & COMMANDS	1983.0	41
MEDIA MATERIALS	COMPUTERS IN THE EVERYDAY WORLD	1983.0	41
MEDIA MATERIALS	COMPUTERS: WHAT ARE THEY	1983.0	41
MEDIA MATERIALS	INPUT: PUTTING DATA INTO A COMPUTER	1983.0	41
MEDIA MATERIALS	LEARNING THE SPECIAL SYMBOLS	1983.0	41
MEDIA MATERIALS	LOGIC MAPS: USING FLOWCHARTS	1983.0	41
MEDIA MATERIALS	LOOKING INSIDE A COMPUTER	1983.0	41
MEDIA MATERIALS	OUTPUT: RESULTS FROM COMPUTER PROCESSING	1983.0	41
MEDIA MATERIALS	PROGRAMMING: GETTING STARTED IN BASIC	1983.0	41

40-43: UNFAVORABLE EVALUATION RESULTS
50: PRODUCT HAS BEEN DISCONTINUED
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COMPUTER LITERACY/SCIENCE TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
MENTOR SOFTWARE	INTRO. TO MICROCOMPUTERS	1979.0	40
METACOMET SOFTWARE	PROGRAMMABLE CUBE	0.0	40
MICRO POWER & LIGHT	COMPUTER IS: TERMS DEVICES SHAPES & SIZES	0.0	40
MICRO POWER & LIGHT	ELECTRONIC TOOL	0.0	40
MICRO POWER & LIGHT	PROGRAM: ART OF TALKING TO COMPUTERS	0.0	40
MUSE SOFTWARE	KNOW YOUR APPLE	0.0	60
MUSE SOFTWARE	ROBOTWAR	1981.0	40
ORION TRAINING SYSTEMS	BASIC PROGRAMMING	0.0	40
PEACHTREE SOFTWARE (EDUWARE)	HANDS ON BASIC	0.0	40
PROGRAM DESIGN	MACHINE LANGUAGE STEP BY STEP	0.0	40
PROGRAM DESIGN	NEW STEP BY STEP	0.0	40
PROGRAM DESIGN	STEP BY STEP THREE	0.0	40
PROGRAM DESIGN	STEP BY STEP TWO	0.0	40
SCIENCE RESEARCH ASSOCIATES	DISCOVERING BASIC	1982.0	41
SCOTT FORESMAN	COMPUTER APPLICATIONS	1984.0	42
SOUTHWESTERN PUBLISHING	MICRO EDITOR	1983.0	41
SOUTHWESTERN PUBLISHING	STRUCTURED BASIC	1983.0	41
SPINNAKER SOFTWARE	FACE MAKER	0.0	60
STERLING SWIFT PUBLISHING COMPANY	DISCOVER BASIC PROBLEM SOLVING	0.0	40
STERLING SWIFT PUBLISHING COMPANY	HOW TO PROGRAM IN THE BASIC LANGUAGE	0.0	40
SUNBURST COMMUNICATIONS	ARROW DYNAMICS	1983.0	42
SUNBURST COMMUNICATIONS	BLAZING THE BASIC TRAIL	1984.0	41
SUNBURST COMMUNICATIONS	MEET THE COMPUTER: INTERMEDIATE BASIC	0.0	40
SVE	COMPUTER AWARENESS	1981.0	40
SVE	COMPUTER LITERACY ADVENTURES OF LOLLIPOP DRAGON	0.0	40
SVE	INTRO. TO COMPUTERS	0.0	40
TEACHER SUPPORT SOFTWARE	KEY GAME	0.0	60
TEACHER SUPPORT SOFTWARE	KEYBOARD	0.0	60
TIES	FIRST STEP	0.0	60
TIES	SECOND STEP	0.0	60
TIES	THIRD STEP	0.0	60
WIMS COMPUTER CONSULTING	ANTFARM	0.0	40

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EARLY CHILDHOOD INDEX

Evaluations of programs which may be appropriate for children younger than six years of age may be found in various subject area sections within this document. To assist teachers in finding such products, abstracts of these products have been included in this "Early Childhood" section. Teachers wishing more information on any of these products will find the reference to the appropriate subject area in the abstract.

AUTHORIZED

TITLE	PUBLISHER	AGES	STATUS	ABSTRACT PAGE	REPORT PAGE
Bumble Games	The Learning Company	4 - 10	Supplementary	Earl 3	Ma 9
Count and Add	Edusoft	4 - 9	Supplementary	Earl 3	Ma 15
Gertrude's Secrets	The Learning Company	4 - 9	Supplementary	Earl 4	Ma 29

UNDER THIRD STAGE REVIEW

Counters	Sunburst Communications	5 - 6	Still Under Review	Earl 5	Ma 59
Learning About Numbers	C & C Software	4 - 10	Still Under Review	Earl 5	Ma 81
Stickybear Numbers	Weekly Reader	3 - 6	Still Under Review	Earl 6	Ma 121
Stickybear Opposites	Weakly Reader	3 - 6	Still Under Review	Earl 6	La 37
Stickybear Shapes	Weekly Reader	3 - 6	Still Under Review	Earl 7	Ma 123

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

Earl 9

BUMBLE GAMES

DESCRIPTION

Title: Bumble Games
Version: 1982
Publisher: The Learning Company (Addison Wesley)
Cost: $85.95 (1985)
Subjects: Mathematics, Early Childhood
Users : Ages 4 to 10
Components: 1 diskette and backup, teacher guide (46p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor
IBM PC Family, 64K, color monitor, joystick optional
Alberta Education Call No.: QA 90 B941g 1982

ABSTRACT

"Bumble Games" is a set of six sequential programs designed to introduce the user to plotting number pairs, using number positions to name positions in an array and points on a grid. The objectives in the games are (1) to guess the location of a "special" number hidden on it, (2) to find "Bumble" by specifying coordinates, (3) to find a lost butterfly by specifying locations on a 5X5 grid, (4) to pinpoint the location of a space ship by specifying points on a grid, (5) to line up four coordinate positions in a straight line either diagonally, horizontally or vertically, and (6) to draw figures on a grid.

The Apple and IBM versions of "Bumble Games" have been designated as **SUPPLEMENTARY** learning resources in elementary mathematics. For further information, see the full report in the Math section.

COUNT AND ADD

DESCRIPTION

Title: Count and Add
Version: 1982
Publisher: EduSoft
Cost: $29.95 U.S. (1984)
Subject: Mathematics
Users : Ages 4-9
Components: 1 diskette, guide (3p.), backup copy may be made.
System Requirements: Apple II+/IIe/IIc, 32K, 1 disk drive, color monitor desirable
Alberta Education Call No.: QA 115 C855 198-

ABSTRACT

Young children will learn basic counting and addition skills through four related programs.

In "Count", the user is required to count colored objects.

"Add1", "Add2" and "Add3" ask the user to add objects (maximum of 16 in each group). The difference between the programs is in the amount of concrete assistance given. "Add1" requires the user to count two groups of objects and the objects are then moved together for the determination of the sum. "Add2" presents objects to be counted and then added but does not move them together. In "Add3" the user adds digits without the assistance of concrete objects. If an error is made, the feedback presents objects to be counted and added.

The programs are sequenced internally. Success in any program leads the student to more difficult questions in that same program. In "Count" this means progression of up to 56 objects to be counted. In the adding programs, the ceiling is adjusted up to a maximum of 16 in each group. Lack of success results in regression to an easier level. As no records are kept, this progression and regression is available only during the sitting.

The teacher can adjust maximum ceilings, initial ceilings and number of questions by changing the program listing. Instructions on how to do this are given in the documentation.

"Count and Add" has been designated as a **SUPPLEMENTARY** learning resource. For further information, see the full report in the Math section.

GERTRUDE'S SECRETS

DESCRIPTION

Title:	Gertrude's Secrets	**Version:**	1982
Publisher:	The Learning Company (Addison Wesley)	**Cost:**	$81.56 (1985)
Subject:	Problem Solving	**Users :**	Ages 4-9

Components: 1 diskette and backup, teacher guide (57p.), activity sheets (black line masters)

System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joystick optional
IBM PC family, 64K, color monitor, joystick optional

Alberta Education Call No.: BC 177 G384s 1982

ABSTRACT

This diskette is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to create order and to plan ahead by solving puzzles that involve arranging game pieces according to a given rule or by guessing a secret rule.

This program consists of three types of puzzles, each having two or three levels of difficulty. The child manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the student to arrange shapes according to given rules. The third puzzle requires the student to decide what rule is being applied (intersection of sets).

The Apple and IBM versions of "Gertrude's Secrets" have been designated as **SUPPLEMENTARY** learning resources in elementary mathematics. For further information, see the full report in the Math section.

COUNTERS

DESCRIPTION

Title: Counters
Publisher: Sunburst Communications
Subjects: Mathematics, Early Childhood
Components: 1 disk with backup, teacher's guide (22p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, colour monitor

Version: 1983
Cost: $49.00 US (1984)
Users: Kindergarten - 1

ABSTRACT

This program is designed to give children hands-on experience with counting and with counting as the basis of addition and subtraction.

This drill and practice program consists of three parts: counting, addition and subtraction. Counting and addition have five levels of difficulty, subtraction has two levels. Counting involves counting objects and matching arrangements of objects to numerals one through nine. Addition at Level 1 begins with two collections of objects and then progresses sequentially to number sentences at level 5. The sums never exceed 9. In the subtraction program, Level 1 deals with the separation of one collection into two parts. One part is shown on the screen and the user must reconstruct the other part. Level 2 involves number sentences with the largest number never exceeding 9.

"Counters" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

LEARNING ABOUT NUMBERS

DESCRIPTION

Title: Learning About Numbers
Publisher: C & C Software
Subject: Mathematics, Early Childhood
Components: 1 disk, user's guide (19p.), keyboard labels, certificate for backup disk
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred

Version: 1983
Cost: $40.00 U.S. (1984)
Users : Preschool-Grade 4

ABSTRACT

"Learning About Numbers" is designed to provide young children with a variety of experiences in working with numbers including practice in counting, telling time, adding, subtracting, multiplying and dividing whole numbers.

This disk contains three programs:

LET'S COUNT - This program provides practice in numeral recognition and reinforcement of basic counting skills from one to twelve.

LET'S TELL TIME - After presenting the time on a digital watch, this program asks the student to set the hands on a conventional clock to the same time. Sequenced skill levels lead the student through recognition of time on the hour, half hour, quarter hour and finally to five minute intervals.

ARITHMETIC FUN - A graphics "story" is used to provide the setting for practice with arithmetic facts.

"Learning About Numbers" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section

STICKYBEAR NUMBERS

DESCRIPTION

Title: Stickybear Numbers
Publisher: Weekly Reader Family Software (Xerox)
Subjects: Mathematics, Early Childhood
Components: 1 disk, teacher's guide (4p.), look book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred

Version: 1982
Cost: $49.95 (1984)
Users : Ages 3 to 6

ABSTRACT

The objectives of this program are to reinforce counting and number recognition.

The student is instructed to depress any number from 0 to 9. The computer then generates an animated display, accompanied by sound, of the corresponding number of objects. If the space bar is pressed, one object will disappear and the number portrayed will be decreased by one. This process can be continued until the screen is cleared of objects. The space bar can similarly be used to count up from zero to nine.

"Stickybear Numbers" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

STICKYBEAR OPPOSITES

DESCRIPTION

Title: Stickybear Opposites
Publisher: Weekly Reader Family Software (Xerox)
Subjects: Language Arts, Early Childhood
Components: 1 disk, teacher's guide (4p.), book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred

Version: 1983
Cost: $49.95 (1984)
Users : Ages 3 to 6

ABSTRACT

This program is designed to introduce and reinforce the concept of opposites.

This program uses high resolution, colored, animated graphics and sound to portray one of twenty-three pairs of activities. By using the paddles or by pressing certain keys the student can change the animated display to portray an opposite activity (e.g. a glass emptying and filling, a car going forward or backward, etc.) or a companion activity (e.g. having the concept of "up" and "down" illustrated by a bouncing ball and by a companion activity of a seesaw in motion). Each display has a name on it such as "high" or "low", "short" or "tall", etc.

"Stickybear Opposites" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Language Arts section.

STICKYBEAR SHAPES

DESCRIPTION

Title: Stickybear Shapes
Publisher: Weekly Reader Family Software (Xerox)
Subjects: Mathematics, Early Childhood
Components: 1 disk, teacher's guide (4p.), shapes book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred

Version: 1983
Cost: $49.95 (1984)
Users : Ages 3 to 6

ABSTRACT

This program is designed to identify and reinforce the recognition of five common geometric forms: circle, square, triangle, rectangle and diamond.

This program contains three games:

1. PICK-IT: Each picture display contains a missing shape. Students choose one of the five shapes displayed at the bottom of the screen (circle, square, triangle, rectangle, and diamond) in order to complete the picture.
2. NAME IT: From a choice of five shapes, students must choose one to match the name of the shape displayed.
3. FIND IT: Using the arrow keys, students match a sample shape presented at the bottom of the screen with a corresponding shape displayed in an array at the top of the screen.

"Stickybear Shapes" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math Section.

EARLY CHILDHOOD TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
BIPACS	LEARN TO TELL TIME	0.0	41
COMPUTATIONS	EARLY ELEM. 1	0.0	42
COMPUTATIONS	EARLY ELEM. 2	0.0	42
COMPUTER COURSEWARE SERVICES	TELLING TIME	1982.0	41
EDUSOFT	ALPHABET SONG	0.0	60
EDUTEK	COUNT TO 10	0.0	60
EDUTEK	COUNTING FUN	0.0	60
GEORGE EARL	MOTHER GOOSE RHYMES	0.0	40
H B SOFTWARE	KINDERGARDEN #2	1983.0	42
HARTLEY COURSEWARE	CALENDAR SKILLS	1981.0	41
HARTLEY COURSEWARE	CLOCK	1981.0	41
HARTLEY COURSEWARE	LETTER RECOGNITION	1981.0	40
HARTLEY COURSEWARE	OPPOSITES	0.0	40
HARTLEY COURSEWARE	USING A CALENDAR	1982.0	42
ISLAND SOFTWARE	LETTER GAMES	1982.0	40
ISLAND SOFTWARE	MILK BOTTLES	1982.0	40
ISLAND SOFTWARE	PUSS IN BOOT	0.0	40
LITTLE SHAVER SOFTWARE	COLORS	1983.0	40
LITTLE SHAVER SOFTWARE	COMPUTER GOOSE	1983.0	40
LITTLE SHAVER SOFTWARE	NEATNESS	1983.0	40
LITTLE SHAVER SOFTWARE	NUMBERS	1983.0	41
LITTLE SHAVER SOFTWARE	OBJECTS	1983.0	40
LITTLE SHAVER SOFTWARE	SAFETY	1983.0	40
LITTLE SHAVER SOFTWARE	TIME	1983.0	40
PEACHTREE SOFTWARE (EDUWARE)	INTRODUCTION TO COUNTING	0.0	41
SPRINGBOARD SOFTWARE	EARLY GAMES MATCHMAKER	0.0	40
SUNBURST COMMUNICATIONS	GETTING READY TO READ & ADD	1984.0	41
WEEKLY READER FAMILY SOFTWARE	STICKYBEAR ABC	1982.0	42
WEEKLY READER FAMILY SOFTWARE	STICKYBEAR BOP	1983.0	41

40-43: UNFAVORABLE EVALUATION RESULTS
50: PRODUCT HAS BEEN DISCONTINUED
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70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

INDEX DE FRANÇAIS

APPROUVÉS

En date du 30 avril 1985, aucun matériel pour le Français ne fut approuvé.

LISTE DES TITRES NON RECOMMANDÉS Fr 3

TITRES NON RECOMMANDÉS EN FRANÇAIS

MAISON D'ÉDITION	TITRE	©	NO.
CENTRE FRANCO-ONTARIEN	ANI-MOTS	0.0	60
CENTRE FRANCO-ONTARIEN	BONJOUR	0.0	60
COMPUTATIONS	FRENCH VOCABULARY DRILL	1982.0	41
GEORGE EARL	THE FRENCH HANGMAN	0.0	40
GESSLER EDUCATIONAL SOFTWARE	FRENCH FOR THE TRAVELLER	0.0	50
GESSLER EDUCATIONAL SOFTWARE	LE VOCABULAIRE FRANÇAIS	0.0	50
GESSLER EDUCATIONAL SOFTWARE	MESAVENTURES CULTURELLES	1984.0	42
GESSLER EDUCATIONAL SOFTWARE	POKER PARI	1983.0	41
GESSLER EDUCATIONAL SOFTWARE	UN COURS DE GRAMMAIRE	1983.0	41
HEINMANN COMPUTERS IN EDUCATION	COMPRENEZ 1	0.0	60
HEINMANN COMPUTERS IN EDUCATION	RÉPONDEZ 1	0.0	60
INFORMATICS SOFTWARE	INFOALOUETTE	0.0	60
INTELLECTUAL SOFTWARE	FRENCH COMPREHENSION	0.0	50
INTELLECTUAL SOFTWARE	FRENCH VERBS	0.0	50
ISLAND SOFTWARE	LE VOCABULAIRE FRANÇAIS	0.0	40
JABDSTAFFEL SOFTWARE	VOCABULARY PROMPTER	0.0	40
MANITOBA COMPUTER ASSISTED LEARN	FRENCH C1	0.0	60
PROGRAM DESIGN	WORD SEARCH FRENCH	0.0	40
SCHOOLHOUSE SOFTWARE	GRAN PRIX	0.0	40
SCHOOLHOUSE SOFTWARE	L'ATTAQUE	0.0	40
SCHOOLHOUSE SOFTWARE	L'ATTERRISSAGE	0.0	40
SCHOOLHOUSE SOFTWARE	LA FUSÉE	0.0	40
SCHOOLHOUSE SOFTWARE	LA PUNAISE	0.0	40
SCHOOLHOUSE SOFTWARE	LA TEMPÊTE	0.0	40
SCHOOLHOUSE SOFTWARE	LE CANON	0.0	40
SCHOOLHOUSE SOFTWARE	LE GRAND CHÂTEAU	0.0	40
SCHOOLHOUSE SOFTWARE	LE MONSTRE	0.0	40
SCHOOLHOUSE SOFTWARE	LES COUREURS	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (ÊTRE)	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (PASSÉ COMPOSÉ)	0.0	40
SLIMA ENTERPRISES INCORPORATED	FOREIGN LANGUAGE SERIES FRENCH	1984.0	41
THE PROFESSOR	LE PRISONNIER	1983.0	41
THE PROFESSOR	LIEUX ET PERSONNAGES CÉLÈBRES	0.0	41
THE PROFESSOR	MOTS CACHÉS	0.0	41
THE PROFESSOR	MOTS CROISÉS ET MOT SECRET	0.0	41
THE PROFESSOR	SAVOIR ÉCRIRE	1983.0	41
THE PROFESSOR	TERRORISTE	1983.0	41
THE PROFESSOR	VOL.1 AUGMENTEZ VOTRE VOCABULAIRE	1963.0	41
THE PROFESSOR	VOL.2 AUGMENTEZ VOTRE VOCABULAIRE	1983.0	41
VIFI SOGICIEL	HANSEL & GRETEL	0.0	60
VIFI SOGICIEL	J'AMÉLIORE MON FRANÇAIS	0.0	60
VIFI SOGICIEL	J'EXPLORE L'ESPACE EN CALCULANT	0.0	60
VIFI SOGICIEL	LA BELLE AU BOIS DORMANT	0.0	60

40-43: RÉSULTAT D'ÉVALUATION DÉFAVORABLE
50: CET ARTICLE N'EST PLUS DISPONIBLE
60: IMPOSSIBILITÉ D'OBTENIR UNE COPIE POUR FIN D'ÉVALUATION
70: CONTENU NE COUVRE PAS LE PROGRAMME D'ÉTUDES DE L'ALBERTA

LANGUAGE ARTS INDEX

AUTHORIZED

TITLE	PUBLISHER	GRADES	STATUS	PAGE

As of April 30, 1985, no titles had been specifically authorized for Language Arts; however, some word processing packages authorized for use in Business Education may be appropriate for Language Arts classes. Please refer to the Business Education Index.

UNDER THIRD STAGE REVIEW

Bank Street Writer (48K Version)	Scholastic	Elem. +	Still Under Review	Bus 9
Bank Street Writer (64K/128K Version)	Scholastic	Elem. +	Still Under Review	Bus 13
Cloze Plus Levels C - F	Milliken Publishing Company	2 - 8	Still Under Review	La 3
Comprehension Power: Levels D - L	Milliken Publishing Company	3 - 12	Still Under Review	La 9
English Achievement I - V	Microcomputer Workshops	10 - 12	Still Under Review	La 13
Fundamental Spelling Words in Context	Random House	1 - 8	Still Under Review	La 17
Homonyms, Verbs & Pronouns	Milliken Publishing Company	3 - 9	Still Under Review	La 21
Letter Recognition & Alphabetization	Milliken Publishing Company	1 - 8	Still Under Review	La 25
Pop'R Spell & Pop'R Spell Challenge	Milliken Publishing Company	3+	Still Under Review	La 29
Sentence Combining I	Milliken Publishing Company	4 - 8	Still Under Review	La 31
Sentence Combining II	Milliken Publishing Company	6 - 9	Still Under Review	La 35
Stickybear Opposites	Weekly Reader Family Software	K-1	Still Under Review	La 37
The Spelling System	Milliken Publishing Company	4 - 8	Still Under Review	La 39
Working With Words	Custom Micro Systems	1 - 3	Still Under Review	La 43

LIST OF TITLES WE ARE UNABLE TO RECOMMEND La 47

CLOZE PLUS LEVEL C

DESCRIPTION

Title: Cloze Plus Level C
Author(s): Instructional/Communications Technology & Milliken Publishing Co
Publisher: Milliken Publishing Co
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr, Cambridge, Ontario N3C 3N4
Subjects: Language Arts
Topics: Developing comprehension skills, improving vocabulary
Components: 4 disks, teacher's guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $225.00 (1985)
Tel. #: (519) 658-4621
Users: Grades 2 - 5

OBJECTIVES

This program is designed to develop comprehension and vocabulary knowledge through structured context analysis activities.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of twenty lessons on four disks. It provides practice in context analysis skills based on eleven context clues which include synonyms, antonyms, word association, time/order, signal words and phrases, pronoun referents, similarities/differences, form/function, conclusion/summary, categorization/classification, and word definitions. Each lesson consists of a seven to twelve paragraph selection on a particular topic such as natural science, sports, inventions, myths, legends, etc. The lessons are described as being organized in ascending order of difficulty. Visual displays are provided in addition to textual information for some of the selections. The student reads the selection, paragraph by paragraph, and respones to the questions which are mainly multiple choice with a few in short answer format.

PEDAGOGICAL CONTENT EVALUATION

The level of this program is described as level three, but the guide states that this program should not be used with students whose independent reading level is below level four. The content is likely too challenging for most grade three students. The visual displays are good and add to the textual information; however, the maps show the United States rather than Canada. The sequencing of the stories is not always in ascending order of difficulty. Drill and practice is provided but there is little instruction. Most of the selections are interesting, but some are not metricated and are American in content e.g. Annie Oakley, Paul Revere and Yankee Doodle.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of name entry, selection of a class number, entry of a password, input of a letter from multiple choice lists, input words, use of RETURN key for page turning, use of SPACE BAR for accessing clues and ESC for exiting the program.

All questions are preprogrammed and follow a set order. A preponderance of multiple choice questions are used along with some short answer type questions. The type of question varies to focus on the different comprehension skills being practiced.

Feedback, using a combination of text and graphics, is immediate. A correct response results in a short congratulatory message and a piece of a graphic picture puzzle is shown. On the first incorrect response the student is told to try again and may ask for a clue before the second attempt. If the second attempt is incorrect, the correct response is given. At the end of the lesson, the completed picture puzzle is displayed even if every question was not answered correctly. Quantitative feedback is provided at the end of each lesson giving a summary of the number of correct responses, the student's percentage, the number of second tries and the number of clues required. In addition a second screen showing the student's performance in all eleven skill areas is provided.

No pre- or post-tests are provided.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate and effective. The input of responses to the multiple choice questions is weak as there is no opportunity to correct or change a response once it has been typed.

The questioning techniques are appropriate to the content. While the order of questions is preset, there is a good variety of questions. Unfortunately the word statement data bank is limited; moreover, some words which are correct are not accepted. The documentation indicates that assistance is provided to overcome spelling errors, but the student is merely told the answer is incorrect and to try again. The clues option is a good idea; however, the clues are not always helpful.

The feedback is generally appropriate and effective; however, more assistance is required in the negative feedback. Although no tests are provided with the program, the quantitative feedback provides the teacher with valuable diagnostic information.

It is unfortunate that there are no branching functions in this program. This program really provides drill and practice rather than instruction in context analysis.

TECHNICAL CHARACTERISTICS DESCRIPTION

The text is presented in enlarged upper and lower case letters. Instructions are printed in large boldface type. Inverse, flash and underlining are used to emphasize important words, etc. The program prompts indicate when input is required. Some graphic displays such as maps, diagrams, and graphic puzzles are included. No sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality of this program is very good. Screen clarity is excellent and the enlarged print is appropriate for the target audience. The techniques used for highlighting are effective. The graphics are interesting and relevent to the program. The locked keyboard and correction functions are appropriate and useful.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A student orientation to the program is suggested. No specific entry competencies are indicated, but it is suggested that students be placed at or slightly below their independent reading level. The management system allows the teacher to make individual assignments, add or delete students, review individual and class performance, review a lesson and receive printed records of student performance. The system has a capacity of one hundred students in five classes. Security is provided by using a password. The documentation provides rationale, descriptions of skill areas covered, a lesson overview, entry levels, program implementation, operating instructions, management system use, student orientation, and use of the drill feature. Two reproducible sheets are provided, one for a class schedule and the other for a skills record sheet. An "Easy Does It " card is provided as a student guide for using the program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system, which is optional, is effective and relatively easy to use. Some teacher time is required to input the student names and make the necessary assignments. The capacity is sufficient in most situations. The system automatically keeps track of the the student's progress and a print out giving a summary of the eleven individual skill areas is very useful. The program will also alphabetize the student names. The ability to transfer a complete class record from one disk to another is a useful feature. Assigning specific lessons to a student ahead of time is an advantage for the teacher. The teacher documentation is clear, detailed and easy to follow. The program is easy to implement and requires minimal teacher computer competency. Little teacher supervision is required once the assignments are made.

SUMMATION

The technical design and the management system are very good. The use of structured cloze type exercises is good. This level appears to be too difficult for most of the grade three students and would likely be more appropriate for grades four and five. It is noted that the content is not metricated and some of the selections have American content. It is unfortunate that no branches are provided for remediation and that there is insufficient assistance given with the negative feedback. The high cost of this package is also a concern.

STATUS

"Cloze Plus Level C" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $225 (1985) from Britannica Learning Materials at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Dev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

CLOZE PLUS LEVEL D

DESCRIPTION

Title: Cloze Plus Level D
Author(s): Instructional/Communications Technology & Milliken Publishing Co
Publisher: Milliken Publishing Co
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr, Cambridge, Ontario N3C 3N4
Subjects: Language Arts
Topics: Developing comprehension skills, improving vocabulary
Components: 4 disks, teacher's guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $225.00 (1985)
Tel. #: (519) 658-4621
Users: Grades 3 - 6

OBJECTIVES
PEDAGOGICAL CONTENT DESCRIPTION

See the report for "Cloze Plus Level C"

PEDAGOGICAL CONTENT EVALUATION

The range of content is more appropriate for the upper target audience; most students in grade four will find it difficult. The sequencing of the stories does not always appear to be in ascending order. The inclusion of visual displays adds interest and helps the student to understand the selection. The content is not metricated and some selections deal specifically with the United States. There is very little instruction in this program and it is really a drill and practice.

INSTRUCTIONAL FORMAT DESCRIPTION
INSTRUCTIONAL FORMAT EVALUATION
TECHNICAL CHARACTERISTICS DESCRIPTION
TECHNICAL CHARACTERISTICS EVALUATION
IMPLEMENTATIONAL SUPPORT DESCRIPTION
IMPLEMENTATIONAL SUPPORT EVALUATION

See the report for "Cloze Plus Level C"

SUMMATION

The technical design and the management system are very good. The use of structured cloze type exercises is good. The content is designed for an American audience and some selections refer specifically to the United States. The maps are not metricated. It is unfortunate that no branches are provided for remediation and that there is insufficient assistance given with the negative feedback. The cost and the lack of Canadian content are important considerations before purchasing this package for use in Alberta.

STATUS

"Cloze Plus Level D" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

See the report for "Cloze Plus Level C"

CLOZE PLUS LEVEL E

DESCRIPTION

Title: Cloze Plus Level E
Author(s): Instructional/Communications Technology & Milliken Publishing Co
Publisher: Milliken Publishing Co
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr, Cambridge, Ontario N3C 3N4
Subjects: Language Arts
Topics: Developing comprehension skills, improving vocabulary
Components: 4 disks, teacher's guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $225.00 (1985)
Tel. #: (519) 658-4621
Users: Grades 4 - 7

OBJECTIVES
PEDAGOGICAL CONTENT DESCRIPTION

See the report for "Cloze Plus Level C"

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate for the intended users. The sequence and depth are adequate for most of the target audience; however, the depth is lacking for some of the students who are having difficulty and require additional assistance in a specific areas. This program does provide some clues if the user makes use of this option, but this does not really provide sufficient instruction for a user with difficulties. Users need to be aware of the American content, but this does not necessarily preclude the use of this program. If the teacher provides some appropriate background information, the material may be effective.

The readability level is suitable for average and above average students in the target audience, but weaker students will likely have some difficulty with the complex sentence structure used.

INSTRUCTIONAL FORMAT DESCRIPTION
INSTRUCTIONAL FORMAT EVALUATION
TECHNICAL CHARACTERISTICS DESCRIPTION
TECHNICAL CHARACTERISTICS EVALUATION
IMPLEMENTATIONAL SUPPORT DESCRIPTION
IMPLEMENTATIONAL SUPPORT EVALUATION

See the report for "Cloze Plus Level C"

SUMMATION

The technical design and the management system are very good. The range, sequence and depth of content appear to be suitable; however, there is a concern about the American bias in some of the selections. The documentation purports this program to be instructional in nature; however, it is really drill and practice. It is unfortunate that there are no branches provided for remediation and that there is insufficient assistance given with the negative feedback.

STATUS

"Cloze Plus Level E" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

See the report for "Cloze Plus Level C"

CLOZE PLUS LEVEL F

DESCRIPTION

Title: Cloze Plus Level F
Author(s): Instructional/Communications Technology & Milliken Publishing Co
Publisher: Milliken Publishing Co
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr, Cambridge, Ontario N3C 3N4
Subjects: Language Arts
Topics: Developing comprehension skills, improving vocabulary
Components: 4 disks, teacher's guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $225.00 (1985)
Tel. #: (519) 658-4621
Users: Grades 5 - 8

OBJECTIVES
PEDAGOGICAL CONTENT DESCRIPTION

See the report for "Cloze Plus Level C"

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate for the intended users. The sequence and depth are adequate; however, the depth is lacking for some of the students who are having difficulty and require additional assistance in specific skills. This program does provide some clues if the user makes use of this option, but this does not really provide sufficent instruction for a user with difficulties. This is really a drill and practice program. Teachers need to be aware of the American content in a few of the selections; however, this does not necessarily preclude the use of this program.

INSTRUCTIONAL FORMAT DESCRIPTION
INSTRUCTIONAL FORMAT EVALUATION
TECHNICAL CHARACTERISTICS DESCRIPTION
TECHNICAL CHARACTERISTICS EVALUATION
IMPLEMENTATIONAL SUPPORT DESCRIPTION
IMPLEMENTATIONAL SUPPORT EVALUATION

See the report for "Cloze Plus Level C"

SUMMATION

The technical design and the management system are very good. From a pedagogical point of view, the range, sequence and depth of content are adequate, but the American bias in a few of the selections must be noted. The documentation purpurts this program to be instructional in nature; however, it is really drill and practice. It is unfortunate that there are no branches provided for remediation and that there is insufficient assistance given with the negative feedback.

STATUS

"Cloze Plus Level F" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

See the report for "Cloze Plus Level C"

COMPREHENSION POWER: LEVELS D-L

DESCRIPTION

Title: Comprehension Power Levels D - L
Author(s): Instructional/Communications Technology & Milliken Publishing Company
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Users: Level D = Grades 3 - 7; E = 4-8; F = 5-9; G = 6-10; H = 7-11; I = 8-12; J = 9-12; K & L = 10-12
Topics: Reading comprehension & evaluation, improving vocabulary
Components: 4 disks, teacher's guide (28p.), reading selections (19p.) for each level
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Display Language: English
Cost: $225.00 each (1985)
Tel. #: (519) 658-4621

OBJECTIVES

This inductive comprehension-building series is designed to develop a student's ability to follow directions successfully, provide extensive and varied reading experience, improve vocabulary (word meaning and usage), develop ability to preview more effectively, develop ability to read more rapidly while reading comprehensively, and provide extensive practice with twenty-five major comprehension skill stategies.

PEDAGOGICAL CONTENT DESCRIPTION

Each program in the series consists of four diskettes, each containing three lessons and a manager program. Each lesson consists of the introduction of key words in context, an optional preview section consisting of a sentence or two from the beginning of paragraphs in the selection, and a comprehensive reading selection. First, the student reviews new vocabulary which is presented in contextual sentences. If the preview is assigned by the teacher or selected by the student, it is read and followed by a general concept type multiple choice question and a five part recall question which requires YES and NO responses. In the comprehensive reading of a selection, the teacher or student may choose an appropriate reading rate (from 50 - 650 words per minute) for automatic advancement through the lessons or manual advancement which is controlled by pressing the return key. If automatic advancement is chosen, the student reads the text which is presented line by line at a predetermined rate. The reading rate may be altered after each segment. If a student selects a manual presentation, an untimed display of six to eight lines of a segment is presented. Each reading selection is usually divided into eight or nine segments with each segment followed by one to three skill based comprehension questions designed to recap information, consolidate understanding and develop organizational thinking skills. A total of twenty multiple choice questions are presented for each selection and the documentation indicates that a lesson takes approximately twenty minutes to complete, depending on whether the preview is used. Shorter time allotments may be used by breaking up the assignments. The questions provide practice in twenty-five specific comprehension skills which are included under the broader comprehension skill areas of literal understanding, interpretation, analysis, evaluation and appreciation. Topics chosen for the reading selections include adventure, contemporary issues, sports, biography, career/consumer awareness, literature, etc.

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate and generally effective for the target audience. The programs cover varied, informative and generally interesting topics with associated activities which can be completed in a suitable length of time. Sufficient practice is provided; however, some specific comprehension skills are emphasized more than others. Some of the key word explanations do not provide sufficient detail for a student who is unfamiliar with the vocabulary. There is no prescribed sequence of selections; however, it is possible to sequence the activities within each selection e.g. key words, preview and then reading.

The content is intended primarily for an American audience. Teachers need to be aware of this and will have to deal with American bias in some of the selections; however, this should not preclude the use of this series. The vocabulary, sentence structure and length of selections are appropriate. Although the content is structured in a similar way to readers and workbooks, the computer's capabilities are used effectively to manage student records and to provide valuable diagnostic information on many comprehension sub-skills for teacher/student use.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entries of name, class number and password, menu selection, input of multiple choice or Yes and No answers, RETURN key for page turning, "R" for rereading a segment, and ESC for leaving the program and receiving a read-out of progress to that point.

The questions are preprogrammed in a set order with the student having two chances to respond correctly.

Feedback is provided immediately after every response. A correct response results in one of several short congratulatory messages. The teacher also has the option of using graphic reinforcement as a reward. After the first incorrect response, the student has the option of rereading the segment before making a second attempt. If the second attempt is wrong, the correct response is given. Quantitative feedback is available at the end of each segment and at the end of each reading selection. This provides information regarding the reading rate, comprehension percentage, reading index, number of rereads, number of questions and the number of attempts. The student may also see a skills report which lists each skill tested, number correct of the number presented in each skill, and the areas of difficulty.

No pre- or post-tests are included in this series and no branching is provided.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate and effective for most of the series but the student plays a somewhat passive role in the presentation of key words in context. The projected time for completion of a lesson is appproximately twenty minutes; however, it may take some students longer. This can be can be affected by the choice of preview, the number of re-reads, and the slow loading time of each program. A selection can be completed in one sitting, but it can also be broken into two segments for slow readers. The directions are clear and specific with the programs demanding accuracy in answering. Questioning techniques are appropriate and test a variety of comprehension skills. The questions are generally thought-provoking and encourage concentration in reading; however, the teacher must be aware that most of the questions are in a multiple choice format.

Some students may not derive maximum benefits from the programs if the reading rate is set too fast. They will merely skim and pick out key words or guess the answers. The opportunity to reread segments is a useful feature. If the time option is used, the text is presented line by line and the transfer of speed from this type of reading to reading on a printed page may be questionable. The series uses a tachistoscopic approach which may not be appropriate for all students in a comprehension series; however, a manual option is also available.

The feedback which is immediate and non-threatening is appropriate for the target audience. It is helpful to have the correct answer given with the original question still on the screen. The quantitative feedback is detailed, relatively easy to understand and is useful to both the student and teacher. It is unfortunate that there are no explanations or help modules as part of the negative feedback.

Although some evaluative information is provided in the quantitative feedback, it would be beneficial to have pre- and post-tests to assist the teacher with initial placement and assessment of the student progress.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in larger than normal print using both upper and lower case letters. Instructions are in upper case letters. Colored graphics are available as reinforcement rewards at the teacher's option. No sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality of this series is generally good. Screen displays are clear and can be read easily. The programs are slow in loading initially as well as between segments. The wait may cause frustration for some students. Exit and entry points at the end of segments in a lesson are effective. Programs are relatively easy for the students to use provided they follow the initial instructions and procedures. The series is reliable and appears to be bomb proof under normal use.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A student orientation to the series is suggested. Although no specific competencies are indicated, the documentation recommends that students should be placed at, or slightly below, their independent reading level (0.5 -1.0 below instructional reading level). Procedures for determining initial reading rates are provided.

The management system enables the teacher to make individual assignments, add/delete students or classes, examine a story, review individual and class performance, and receive printed records of performance. The system has a capacity of one hundred students to a maximum of five classes. Security is provided by using a password.

The teacher documentation provides a rationale for the series, a description of the skill areas covered, a lesson overview, entry levels, program implementation, operating instructions, management system use, student orientation, and the use of the review feature. For each level two reproducible sheets are provided, one for a class schedule and the other for a skills record sheet. An "Easy-Does-It" sheet is also provided with each level as a student operation guide for using the series. A reading selections booklet with key words and the complete text of the twelve selections is provided for teacher use. There are no user support materials included.

IMPLEMENTATIONAL SUPPORT EVALUATION

Although suggestions for reading rate and entry levels are provided, it would be helpful to have a clarification of reading levels and how they relate to grade levels. The suggested student orientation is a good idea and will save teacher time later.

The management system is effective and relatively easy to use if the documentation is read carefully. It is most useful for keeping track of student progress and providing detailed information on precise comprehension skills in print form. Some teacher time is required to input the student names and to make the necessary assignments. The management system has sufficient capacity for most situations. The option of transferring student records from one disk to another is a good feature.

It is noted that if TAB is pressed when the title page is on the screen, the program goes to the initialization menu. Since this could allow a student to obtain a teacher's password and access all records, this weakness should be eliminated.

The teacher documentation is clear, detailed and generally easy to follow. It is helpful for the teacher to have a copy of all the selections and key words without having to go into the series. The series is easy to implement and requires minimal teacher computer competency. Only a minimum amount of teacher supervision should be required once the program is under way.

SUMMATION

The management system is a major strength in this series. It is relatively easy to use and is a very valuable tool for the teacher. The technical design is good, but the slow loading time is a disavantage. The range and depth of content are appropriate with selections covering a wide range of topics most of which are interesting and appealing; however, it is noted that some selections have an American bias. This is a weakness in the series, but the skills covered are valid for our students. The programs provide practice in the major reading comprehension skills and permit a student to improve his/her reading rate at the same time. The documentation is clear, concise and well organized. The inclusion of pre- and post-tests would be helpful for teacher use. User support materials would be beneficial for students requiring further review. It is unfortunate that more assistance is not provided with the negative feedback or as part of a "help" branch.

STATUS

Levels D-L of the "Comprehension Power" Series are undergoing final evaluation and currently have no authorized status.

PURCHASE INFORMATION

This levels in this series may be purchased for $225 (1985) each from Britannica Learning Materials at the address given at the beginning of the report. Sets of three levels (D-E-F) (G-H-I) (J-K-L) may be purchased for $637.50 each. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

ENGLISH ACHIEVEMENT I – V

DESCRIPTION

Titles: English Achievement Series: Levels I - V
Author: Doug Higgins
Publisher: Microcomputer Workshops
Source: 225 Westchester Avenue, Port Chester, NY 10573
Subject: Language Arts
Topics: Drill & practice in English grammar
Components: 1 disk and backup, teacher's guide (18p.) per level
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model III/IV, IBM PC/PCjr

Version: 1982
Display Language: English
Cost: $39.95 US (1985) each
Tel. #: (914) 937-5440
Users: Grades 10 - 12

OBJECTIVES

This series is designed to support student drill and practice in preparing for the "underlined choice format" of the College Entrance Examination Board's (CEEB) English Composition Achievement Test.

PEDAGOGICAL CONTENT DESCRIPTION

This series contains five separate packages which are designed to provide students with drill and practice in various test formats used in the English Composition Achievement Test.

Level I provides users with practice in using the "underlined choice format" to locate errors. Level II contains practice in using the "labeling format", Level III focuses on the "variation format", Level IV covers the "labelling format" again and Level V reviews the "editing format".

Each program begins with instructions and a sample problem with an explanation which the student can review if required. This is followed by a set of sixteen sentence problems chosen randomly from a bank of two hundred sentences. The student must either indicate that the sentence has no error or must select the highlighted part containing the error. The error may be in grammar, punctuation, diction, use of cliches or mixed metaphors. The student may skip a sentence and come back to it at the end of the practice session. When one set of questions is completed, the student has the option of doing more sets or leaving the program. The student is provided with a score estimate, the number right, the number wrong, the number skipped and an error analysis. The error analysis breaks the errors into seventeen different categories with a percentage score for the portions covered. The categories which are included in the total series are fragment or run-on sentences, tense, adjective/adverb, subject/verb, pronoun/antecedent, pronoun case, dangling element, misplaced modifier, faulty comparison, parallel structure, shift in voice, punctuation, wordiness, diction, cliche, and mixed metaphor. The error analysis can be printed but is not saved on the disk.

The documentation suggests that the programs be used in the following order: I, II, IV, III, and V.

PEDAGOGICAL CONTENT EVALUATION

Although this series is designed specifically to prepare students for the English Achievement Test used in the United States, the drill and practice in composition skills would likely be relevant to the Alberta high school program. The range of content is appropriate and well within the attention span of the users. The data bank provides sufficient content coverage. Each practice set of sentences reviews language usage rules concerning proper grammar, punctuation and diction effectively. The student must analyze each sentence carefully in order to determine whether it is error free and if not, the error must be located. The sequence of presentation and the random selection of problems are appropriate to the intent of the programs. The series is easily entered and used with instructions and examples being optional. Appropriate explanations are provided when errors are made. The series will likely be challenging, but useful, for grade ten students, and a good review tool for most grade eleven and twelve students.

The content is varied, interesting and appears to be accurate with no evidence of bias. It is noted that alternate rules for punctuating are not accepted, for example a comma between coordinating clauses of various lengths. Vocabulary, sentence structure and readability are appropriate for the intended users.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of reading the instructions, responding to questions by inputting numbers from one to six and using the RETURN key for page turning. Following the sixteen problems, the student may return to the questions which were skipped, continue with another set of problems, review results, ask for a print out or exit.

The questions are chosen randomly from a data base of two hundred sentences and are presented in sets of sixteen questions. The student is required to select the error in the sentence, indicate there is no error, or skip the sentence.

Feedback is provided after each student input with "Right!" if the input is correct and "Sorry!" when the input is wrong; both are followed by a short text comment. The correct answer is highlighted with a short explanation and an explanation is also provided with the negative feedback. At the end of each set of problems, the student is informed of the approximate achievement score, the number right, the number wrong and the number skipped. An error analysis is provided with percentages in each of the categories completed.

No pre- or post-tests are provided. The programs are intended to serve as a drill and practice activity following teacher instruction. No branching is included.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction and the instructional format are suitable to the intents of the programs. The series is easy to use with an appropriate time required for each set of questions. The questioning technique is appropriate with sufficient randomly generated questions to provide ample practice. Since there is more than one way to correct some of the sentences, some frustration may result until the students become familiar with the program format.

The feedback is immediate and clearly distinguishes between right and wrong responses. Corrective feedback is provided and explanations are given as to why a response is wrong. The explanations serve as review and reinforcement and should help the student learn the required skills. The textual feedback is intended to be light and personalized; however, some comments are inappropriate, for example, the statement "Do you teach here?" appeared when three wrong answers were finally followed by a correct one. In the quantitative feedback the English Achievement score needs further explanation or it may not be useful to all target audiences; however this is a minor factor in the total series.

The error analysis, especially if printed, will assist the teacher in evaluating student progress and planning appropriate follow-up. Unfortunately the questions which were skipped are not indicated in the analysis. Branches to more detailed explanation of errors would be useful.

TECHNICAL CHARACTERISTICS DESCRIPTION

Letters and numbers are presented in standard size with upper and lower case print. Highlighting is used for the four phrases or segments in each sentence and for the correction in the feedback. No sound is used in this series.

TECHNICAL CHARACTERISTICS EVALUATION

The character size and font selection are appropriate for the target audience. Displays are suitable with text screens presented at an appropriate rate. Highlighting of responses and of grammatical problem areas is very effective. This series can be used effectively on a monochrome monitor. The fact that sound is not used is probably an asset to the programs. The series is easy to use with clear directions and it appears to be reliable and bomb-proof under normal use. However, one analyst noted that the printing feature does not work with some common printer cards. The programs terminate at the end of the printing function.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No entry competencies are noted in the documentation. No management system is provided; however, the disks provide the user with the ability to print a copy of the cumulative score and a copy of the cumulative error analysis.

The print documentation includes the programs' objectives, general descriptions, instructions for use, follow-up suggestions and specific instructions for using the programs with different types of computers. The disk documentation provides instructions for use and also provides a sample problem. No user support materials are included.

IMPLEMENTATIONAL SUPPORT EVALUATION

Although no entry competencies are indicated, it is assumed that the students should have had prior instruction and should be familiar with the terminology. Some grade ten students may find the series too challenging; however, most grade eleven and twelve students will likely find it beneficial. The series may be used in a variety of classroom environments, especially for individual or small group work.

The documentation is somewhat limited but it is adequate. The lack of user support materials for remediation and study of error levels is a disadvantage.

The series can easily be used by the students with little or no teacher supervision. Minimal computer competency is required for the use of the programs.

SUMMATION

Although this series is designed specifically to prepare students for the English Achievement Test which is not used in Alberta, the content, instructional design and technical quality would all likely be appropriate for use with our students at the designated levels. The program appears relevant to the present language arts requirements and can be used in an integrative approach to provide additional practice in the mechanics of writing.

STATUS

Levels I - V of "English Achievement" are undergoing final evaluation and currently have no authorized status.

PURCHASE INFORMATION

Each level of this product may be purchased for $39.95 (U.S.) (1985) from Microcomputer Workshops at the address given at the beginning of the report. The full series may be purchased for $175.00 U.S. (1985). The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshops products are carried by Edupro Software. Contact the company directly for availability, price and warranty information (see page v. of the preface).

FUNDAMENTAL SPELLING WORDS IN CONTEXT

DESCRIPTION

Title: Fundamental Spelling Words in Context
Author(s): Bertamax Inc
Publisher: Random House
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Spelling drill and practice
Components: 8 disks, teacher's guide (37p.), loading chart
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model III

Version: 1982
Display Language: English
Cost: $337.50 (1984)
Tel. #: (519) 658-4621
Users: Grades 1 - 8

OBJECTIVES

This program provides drill and practice using words in context from a comprehensive list of commonly used spelling words and most frequently misspelled words. It is inferred that using this program will enable students to become more proficient in spelling at their grade level.

PEDAGOGICAL CONTENT DESCRIPTION

This program, on six disks, provides drill and practice with spelling words commonly used or misspelled in grades one to eight. One disk is used for grades one to three and one each for grades four to eight. The spelling words are presented in context. The grade one level has twenty-eight lessons consisting of ten words each; grades two to eight have forty lessons each with ten to twenty words per lesson. The total program presents 5280 spelling words. Each word is flashed on the screen for a preselected period of time. The student then has to retain the word in memory, say it, and view a sentence with a blank where the target word is to be typed. The program does not allow the student to proceed until the word is spelled correctly.

The words are presented sequentially with increasing difficulty from level to level. The beginning levels are one syllable words and extend to four and five syllables in level eight. A lesson will usually take from three to ten minutes to do, depending on the level and display rate.

PEDAGOGICAL CONTENT EVALUATION

The content range is very good; however, it would be helpful to have the teacher determine the number of words to be presented, especially for slower students.

The sequence is appropriate and well developed from easy to difficult with appropriate increment size. Words are often grouped into the lists according to the type of spelling rule they represent but, the program is not designed around spelling rules. Sentence length and vocabulary are suitable for each level.

The depth is appropriate and effective for the target audience. However, there are no specific review units built into the program. Some words do reappear in later lessons but usually with some changes such as with an added suffix. Rhyming words probably provide the strongest link from one lesson to the next.

The word lists compare favourably with the word lists used in language arts program at each level. The content appears to be accurate and the sentences are quite suitable for the intended users.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of name entry, menu selection, flash speed selection, use of RETURN for page turning, and word inputs. The student is to look at a flashed word, retain it in memory, say it, view it in sentence context, and spell it in the blank space in the sentence.

The spelling words are randomly selected from a limited data bank for each lesson; it varies from ten words per lesson in grade one to twenty words in grade eight. If a student's score is below 90%, the words which were wrong are reviewed at the end of the lesson.

Textual feedback is presented for both positive and negative feedback. A correct response receives a short congratulatory message which is randomly generated from a limited data bank. Incorrect responses get a randomly selected message with such comments as "Sorry, try again!" or "Oh, you missed it".

After a second incorrect response, the word is given and the student must enter it correctly before proceeding to the next word in the lesson. Graphic feedback, a "happy face", is used only when a student completes a lesson on the level one and two disks. Quantitative feedback is provided at the end of each lesson. It consists of the percentage correct, the number of words correct, and the number of words wrong.

No pre- or post-tests are provided. The criteria for success is program controlled. If the score is 90% or above, the student is advised to advance to the next lesson. A student who scores 80% or below is directed to do the lesson again.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is consistent and appropriate for the target audience. The student is an active participant in the program and is given appropriate directions to facilitate word input. Some lessons seem to be long for certain students, but the students appeared to be motivated sufficiently to complete them. Teacher control of the number of words in a lesson would be helpful. The program allows correction of incorrect entries using the left arrow key.

The questions are effectively randomized within the limited data base. There are no prompts or cues until a response has been entered. The students are not allowed to proceed until the correct word has been inputted.

The feedback is immediate, appropriate, personalized and non-threatening. Quantitative feedback is provided at the end of each lesson and provides useful information for the teacher; unfortunately, the student or teacher must record this information since there is no management system. A disadvantage is noted when a student exits a lesson before it is completed; no quantitative feedback is provided.

Pre- and post-tests are not provided but could be helpful for placement and evaluative purposes. The program controlled criteria for success is appropriate for the users. The review provided at the end of the program for the students with scores below 90% is useful but is limited.

TECHNICAL CHARACTERISTICS DESCRIPTION

Letters are enlarged and are all in upper case. The display consists of a rectangular highlighted box wherein the words are flashed. Once the word disappears, then a sentence with a blank space for the missing spelling word appears.

Color is used only for the title and author displays. No sound is used. The only graphic used is a "happy face" that appears at the end of level one and two.

TECHNICAL CHARACTERISTICS EVALUATION

The character size of the text is large, well spaced, and generally easy to read. The use of upper and lower case letters would be beneficial in a spelling program. The format of each page in the lessons is uncluttered and the sentences are short. The use of the highlighted rectangular box is effective. It is noted that a second error results in the underlined word appearing at the bottom of the screen; however, the line is so close to the words that some students may have difficulty determining the letters in the word, especially "E" and F, and "O" and "D". The program is user friendly and appears to be bomb proof under normal use. However, the user must begin a lesson again if (s)he leaves the lesson before it is completed.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No special competencies are required beyond the normal grade level skills. Each disk is a prerequisite for higher grade level disks in the series.

No management system is provided in this program.

The documentation provides a rationale for the program, instructions for using the program, teaching strategies, scope and sequence, and word lists for levels one through eight. A reproducible student record chart is included. No other user materials are provided.

IMPLEMENTATIONAL SUPPORT EVALUATION

Although no special competencies are specified, it is noted that some students have difficulty with the keyboard. Some younger students as well as some weaker spellers tend to forget the flashed word while they are looking for the letters on the keyboard. Some familiarity with the keyboard is an asset in using this program.

The program would be greatly enhanced if a management system were available.

The teacher documentation is well organized and easy to follow. The word lists are particularly valuable for teacher use. The program is easy to operate and the students will require little supervision after the initial familiarization with the program.

SUMMATION

The program is well designed and interesting to use. Teaching spelling in context and the "look and say" approach is good; however, the teacher cannot always monitor the student to see if the word is said. The review practice of misspelled words is useful but limited. The inclusion of the spelling words in the documentation is most helpful.

The major weakness of the program is the lack of a management system. It would also be helpful to have quantitative feedback for a user who makes an early exit from the program. The inclusion of a placement test would be beneficial.

STATUS

"Fundamental Spelling Words in Context" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $337.50 (1984) from Britannica Learning Materials at the address given at the beginning of the report. Warranty information was not available at publication.

In Alberta, contact the BLM sales representative - Bev Horan, (403) 458-9264.

HOMONYMS, VERBS & PRONOUNS

DESCRIPTION

Title: Homonyms, Verbs and Pronouns
Author: M.D. Roblyer
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Drill & practice in grammar usage related to homonyms, verbs & pronouns
***Components:** 6 disks, teacher's guide (19p.), information sheets (14)*
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Display Language: English
Cost: $337.50 (1985)
Tel. #: (519) 658-4621
Users: Grades 3 - 9

OBJECTIVES

This program is designed to provide drill and practice in troublesome homonyms and word pairs, irregular verb forms, troublesome verbs, subject-verb agreement, and pronoun usage using skills and concepts that have already been introduced by the teacher.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of six disks which provide drill and practice in grammar problem areas involving homonyms, verbs and pronouns.

HOMONYMS I consists of four lessons dealing with the correct usage of homonyms. Each lesson contains ten pairs of homonyms which are sequenced according to difficulty. HOMONYMS II also consists of four lessons including contraction homonyms, triple homonyms, and two lessons on confusing pairs of homonyms. Each lesson begins with a pre-test which has one randomly generated question for each word in the lesson. If the student achieves the mastery level preset by the teacher, (s)he proceeds to the next lesson. If not, the student goes to the menu where four options are presented which include a general explanation of the lesson concepts, lists of missed words from the pre-test with definitions and example sentences, practice sentences and stop. When the practice has been completed, the student is given the option of taking the test again.

The VERBS I program includes nine lessons on irregular verbs (present, past and past participle) with their usage in sentences and three lessons on problem verb pairs such as lay and lie, etc. Each lesson contains a brief review of the concepts required to complete the lessons, a chart with a list of verbs in three tenses with definitions or hints on how to use them correctly, and practice sentences which demonstrate the rule being reviewed in a multiple choice or fill-in format as chosen by the teacher. A test which consists of twenty questions may be taken at any time; however, if the student fails, (s)he must master the practice before testing again. It is recommended the student look at the Introductions and Directions, and the Verb Forms list for each lesson before beginning the practice sentences. The VERBS II program covers verb agreement at a basic and advanced level with six lessons at each level. The basic lessons include identifying singular and plural verbs, nouns and pronouns with action verbs, the verb "be" - present and past, the verbs "do" and "have" - present, helping verbs, and contractions as main and helping verbs. The advanced lessons include words between subject and verb, inverted order, compound subjects connected by "and", "or", and "nor", indefinite pronouns, collective nouns and amounts, and special nouns ending in "s". This program has similar options to VERBS I except that a Subject-Verb Agreement Rule is used rather than a Verb Forms list.

The PRONOUNS I program covers the usage of pronouns when they are subjects, compound subjects, direct objects, indirect objects, objects of prepositions, and compound objects in sentences. There are two sets of five lessons each; the first set deals with using the pronouns correctly in specific cases and the second set provides mixed practice of pronouns. PRONOUNS II covers the usage of pronouns and their antecedents (six lessons) and the problems in using pronouns (six lessons) covering interrogative pronouns, possessive pronouns and contractions, demonstrative pronouns, pronouns in incomplete constructions, pronouns as appositives, and relative pronouns. Each level contains Introduction and Directions, Help for the Lesson, Practice Sentences, Test Your Skills, and Stop. They function similarly to the other programs described. All of the programs have help branches. A scope and sequence chart is also provided for each program.

PEDAGOGICAL CONTENT EVALUATION

The content range, sequence and depth of HOMONYMS I/II are effective and appropriate for the target audience. The scope and sequence of this program are realistic and particularly complement concepts taught at the upper elementary and junior high level. The lessons can be easily completed in a single sitting and there is sufficient content coverage. The sequence from easy to difficult is developed appropriately from one lesson to the next. The user is offered ample practice with available explanations and examples and may access help branches as required.

The content evaluation for VERBS I, VERBS II, PRONOUNS I and PRONOUNS II is generally the same as for the programs on homonyms with two exceptions. The data bank appears to be more limited, especially in problem verb pairs, and as result the randomization is weaker with sentences being repeated more often. A larger example pool would be beneficial, especially when a student has failed a test and must redo the practice exercises. It is also noted that in sections which explain the rules, an inadequate number of examples is used for each variation.

The content in all programs is accurate and current; however, it is intended for an American audience and lacks Canadian content. Some minor bias in reference to sexual roles and stereotyping is noted, but this should not preclude the use of this program. The readability is appropriate for most of the target audience, but grade three and four students may have some difficulty with the vocabulary.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, multiple choice or fill in the blank responses, SPACE BAR for pointing to a correct response or page turning, "H" for help, "T" for test, "S" to stop practice, ESC to leave the program and update records, "R" to review progress and RETURN key for page turning.

Questions are randomly generated from a very large data base for HOMONYMS I and II and a more limited data base for the other programs. A variety of formats is used including the use of SPACE BAR to pick the correct response, multiple choice and fill in the blank questions. New test questions for students needing to take the test for the second or third time can be generated by the teacher using the manager program.

Positive feeback is immediate and appears throughout the programs in two ways. Randomized congratulatory personalized messages and graphic reinforcement appear after each correct response. Generally the negative feedback consists of an "x" or a textual indication that the response is incorrect and the correct response is provided, usually with a brief explanation. Some programs allow two tries; if the second attempt is wrong, the same procedure is followed. Help can be accessed by the students who require it. No feedback is provided during a test and only one chance is given for each question. Quantitative feedback is available during practices and after pre- and post-tests. The student is given the number correct out of the number tried, a percentage and an indication of a pass or fail. If the student fails he is told to practice some more and to try the test later.

Pre-tests and/or post-tests are provided in each lesson. The teacher is able to generate new tests by using the manager program. Help branches are provided for the students requiring additional assistance.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is generally appropriate and effective for the drill format of the lessons; however, the frequent use of the space bar in some programs becomes monotonous for older students. Also, the use of the space bar as an answer input does not allow a student to correct an input before the progam accepts that response.

Questioning techniques are generally appropriate, but it would be beneficial to increase the size of the data bank in the programs on verbs and pronouns. This would eliminate some of the repetition of sentences that was noted earlier.

The feedback is generally effective. Usually an explanation appears with errors while correct responses are positvely reinforced; however, the use of graphical feedback in the practice exercises tends to slow down the program and it may become somewhat boring for the older target audience. The quantitative feedback is useful and effective.

The pre- and post-tests are useful. Allowing a student who passes the test to proceed to the next level immediately is a good feature. It is beneficial to the teacher to be able to set the mastery level for the tests and to generate new test questions. It would be helpful to a student who has failed a test to be able to try it again without doing the complete practice, particularly when very few questions were wrong or in questions where the space bar was pressed for the answer.

The "help" branches usually contain adequate explanations and hints.

TECHNICAL CHARACTERISTICS DESCRIPTION

Upper and lower case print in standard size is used. Graphics are used with animated graphics indicating a correct response. Highlighting is used to draw attention to parts of sentences. Lighted bars are used in some programs to indicate the number of questions remaining in a practice exercise. Instructions for program use are present at the bottom of the screen during practice sentences. No sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality of this program is good. Displays are generally well designed and are appropriate for the target audience; however, some of the displays in VERBS II contain too much information and appear cluttered. The use of upper and lower case letters is suitable for the users. The graphics are appropriate and effective for the younger target audience, but will likely become somewhat boring for the older students. It would be beneficial to have the graphics as an option. It is noted that the programs are somewhat slow in loading. The program is easy to operate and appears to be generally reliable and bomb-proof under normal use; however, one analyst noted a problem when option five in the management system is used. An "Out of Data Error 15320" appears when the last student record is displayed and it becomes necessary to re-boot the program to get back into it.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The program is based on the rationale that the skills and concepts will be introduced by the teacher prior to using the program. A student orientation to the program is suggested.

The optional management system enables the teacher to make individual assignments, review individual and class performance, receive printed records of student performance and use a password for security. The teacher also presets the mastery levels and is able to generate new tests as required for particular students. The system has a capacity of one hundred students with a maximum of five classes. All names are alphabetically arranged.

The teacher's guide provides an introduction to the program, program implementation, operating instructions, management system use, student orientation, use of the drill feature, optional record-keeping materials (a student/user schedule and student progress chart), and an Easy-Does-It card for a student operational guide. Further documentation is included in the binder with the disks. It provides an introduction, lesson contents, scope and sequence chart and lesson format for each of the programs.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is effective and relatively easy to use, if the documentation is read carefully. The management system automatically updates student records. The feature which allows the teacher to generate new tests is very good and the drill option is very useful for added practice on certain lessons. Some teacher time will be required to input student names and make assignments and it is unfortunate that a teacher is unable to transfer a whole class to another disk. The capacity of the management system is sufficient to meet most needs.

The documentation is clear and generally easy to follow; however, it would be beneficial to the teacher to have the objectives stated. A clarification of the relationship between grades and levels would also be useful. The analysts assume that they are congruent, but this is not specified in the documentation. The program is easy to implement and use. Minimum teacher supervision will be required, if the orientation is done.

SUMMATION

The management system and technical design are generally very good. The range, sequence and depth of content are appropriate with some exceptions. The program is intended for an American audience and some lessons contain bias relating to stereotyping and sexual roles. This is a weakness in the program, but the skills covered are valid for our students. The program may be too difficult, except for enrichment, for students in grades three and four but it is appropriate for upper elementary and junior high students. It may also be used for remediation with senior high students. Generally the instructional techniques are adequate, but the use of the space bar for responses is felt to be a weakness.

STATUS

"Homonyms, Verbs and Pronouns" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $337.50 from Britannica Learning Materials at the address given at the beginning of the report. Each module (i.e. "Homonyms" or "Verbs" or "Pronouns") may be purchased for $120. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

LETTER RECOGNITION & ALPHABETIZATION

DESCRIPTION

Title: Letter Recognition and Alphabetization
Author(s): Milliken Publishing Company
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Letter recognition, alphabetical sequences
Components: 2 disks, teacher's guide (31p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1980
Display Language: English
Cost: $112.50 (1985)
Tel. #: (519) 658-4621
Users: Grades 1 - 8

OBJECTIVES

This program is designed to provide drill and practice for students in grades one through eight in letter recognition, alphabetical sequencing of letters and alphabetizing by first through seventh letter.

PEDAGOGICAL CONTENT DESCRIPTION

Ninety-four problem levels on two disks provide drill and practice in letter discrimination skills, alphabetical sequence skills, and alphabetization skills involving the use of the first through seventh letter. The first fifteen problem levels involve letter recognition beginning with lower case and then uppercase letters. Students respond with a "Y" or "N", indicating the similarity of letters displayed. Levels sixteen to twenty cover alphabetical sequence which requires the student to complete the missing letters of a given alphabetical sequence. The remaining sixty-four problem levels deal with alphabetization skills beginning with problems involving initial letters and ending with problems involving sixth and seventh letters. The format of the problems is varied and includes listing words, creating sentences, recognizing interruption in order, determining word placement in a list, listing given names and listing surnames. Students progress from level to level by reaching a mastery level which is set by the teacher (range 70% to 95%) or preset by the computer at seventy percent. Students may regress by failing to achieve a teacher selected percentage (range 30% to 70%) or the thirty percent preset by the computer. If a student's achievement score is between the mastery level and the failure level, (s)he will require more practice at the same level. The teacher may select the minimum number of questions to be presented at each level (range three to twenty) or use the preset computer number of six.

PEDAGOGICAL CONTENT EVALUATION

The range, sequence and depth of content are appropriate and effective. The sequence is excellent in that there is a logical order of from one skill to another with appropriate increment size. The program provides sufficient practice in a good variety of formats. The vocabulary, sentence structure and length are appropriate and readable for most of the target audience; however, students requiring drill and practice in letter discrimination and alphabetical sequence at the grade one level may have difficulty reading the directions and finding the letters on the keyboard initially.

The computer is used appropriately to enhance drill and practice in an interesting and motivating way.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entries of name, class number and password; selection of problem level; RETURN for page turning; and ESC for leaving the program. Student interaction varies from level to level and includes inputting letter(s) and entering correct responses by pressing the RETURN key when an arrow points to the correct answer. In some levels, students may correct answers by using the left arrow key.

The questions vary with each level and are randomly generated from a limited data bank.

Feedback is immediate and is provided after every student response. The teacher controls the type of feedback after correct responses by selecting animated graphics for positive reinforcement or using textual congratulatory messages. If graphic reinforcement is chosen, one of five short animated graphic displays are presented in random order. An incorrect response results in a large flashing "X" followed by the correct answer; however, in cases where there are more than two possible answers, the student is given a second chance. If the second attempt is incorrect, then the same negative feedback appears. Ongoing quantitative feedback is provided on the screen during the exercise giving the student's placement level, the number of questions completed, the number correct, and the student's current percentage at that level. At the end of the assignment the student is given the total number of problems, number correct, percentage, and what level the student should go to next.

No pre- or post-tests are provided in this program. Performance criteria allowing students to move from one level to another may be preset by the teacher. No branches are available within the program.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is generally appropriate and effective with the student being actively involved. The entry of the password may cause some difficulty initially. The alphabet sequence which requires input of letters may become frustrating and time consuming for some grade one students. It is also noted that although the program uses both upper and lower case letters, grade one students will find only the upper case letters on the keyboard.

The questioning techniques are excellent, particularly in the levels dealing with alphabetization. Questions are appropriate to the content and even though they are drawn from a limited date file, the numbers at each level are sufficient. The number of trials allowed is appropriate to the questioning technique.

Feedback is immediate and generally good. Graphic displays are short and interesting; however, they are rather repetitive and may become somewhat boring after repeated use of the program. Negative feedback is straightfoward with no assistance, but the use of the large flashing "X" is perhaps slightly extreme. Displaying the correct response at the end of a question is a strength. The quantitative feedback is useful, but the ongoing quantitative feedback may be beyond the understanding of the younger target audience.

Since this is a drill and practice program no pre- or post-tests are included; however, a placement test would be beneficial. No branches are provided for remediation in this program, but the student is directed to an easier level when (s)he fails a level. The control functions of the program are very good.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses enlarged print. The character size varies according to the level of activity with the largest print being used for the younger target audience. Lower case print is used extensively for the exercises, but all instructions are in upper case. A clear indication is given when input is required. Some selective erasing and flashing displays are used. Colored graphic reward displays are available as a teacher's option. No sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality of this program is very good. Screen clarity is excellent. The enlarged print and the use of upper and lower case letters are appropriate and effective for the target audience. Required entries are consistent and clearly indicated. The fact that a user can re-enter the program at the point that (s)he left off is a good feature; however, it is somewhat time consuming to have to start from the title page. The graphic rewards are short, simple and interesting but are limited in number. The option of dropping these displays is appropriate, particularly for older students. The flashing of the red "X" in the negative feedback is somewhat insensitive.

The program appears to bombproof under normal use and is user friendly with the exception of the password entry. Many young students find the password entry confusing and a considerable amount of time is wasted. Perhaps, it would be useful to have the password as an option.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Since this program is designed to provide drill and practice, it is expected that students have received instruction in the concepts prior to using the program.

The management system enables the teacher to make individual and class assignments, review individual and class performance, establish personalized performance levels for each student, and receive printed records of student performance. Teachers may prescribe mastery level, failure level and number of problems per level for individuals or the entire class. The system has a capacity of one hundred students with a maximum of five classes. Security is provided by the use of a password. A "Drill" feature which bypasses the management system is available.

The teacher documentation provides an introduction to the program, a scope and sequence chart of the skills covered, operating instructions, management system use, the program's drill feature, and examples of questions presented at each problem level. Four reproducible sheets are included to be used for a student user schedule, student progress, class progress and assignment sheet. An "Easy-Does-It" sheet is provided as a student operational guide for using the program. No user support materials are provided.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is very effective and is relatively easy to use. It will take some time for the teacher to input the student names and make the assignments; however, this time is worthwhile in view of the benefits. Allowing the teacher to determine mastery levels, failure levels and minimum number of problems is an excellent feature. Another strength is the review of student progress and, in the case of levels one to fifteen, the teacher sees which letters are causing word recognition difficulties. Having the graphics as a teacher option is also beneficial. It is unfortunate that individual student records in the management system do not include a record of the number of questions that a student completed at each level. The use of a password for the younger target audience causes some frustration; it may be beneficial to have it as an option.

The teacher documentation is comprehensive with clear and concise explanations. The program is easy to implement and requires minimal teacher competence, if the documentation is read carefully. If the teacher takes time to introduce the program to the students, the amount of teacher supervision will be limited. However, the teacher may have to read instructions to grade one students.

SUMMATION

This program has an excellent management system which adds greatly to the flexibility and value of the program. From a pedagogical viewpoint, the range, sequence and depth of the alphabetization skills levels are very good. Unfortunately, in the the letter recognition and alphabetical sequence, the readability of the instructions which are provided will likely be difficult for many grade one students. Finding the letters on the keyboard will also be somewhat time consuming, especially at the initial stages. The variety of question formats used in the alphabetization skills is excellent. The technical quality of this program is very good with the exception of perhaps the required password for all students. This program with its management system is very worthwhile and has the potential to accomplish more than traditional teaching techniques.

STATUS

"Letter Recognition and Alphabetization" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $112.50 (1985) from Britannica Learning Materials at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

POP'R SPELL
POP'R SPELL CHALLENGE

DESCRIPTION

Title: Pop'R Spell and Pop'R Spell Challenge
Author(s): David Zink, Nancy McIlvain & Kathleen Hilmes
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Spelling, vocabulary development
Components: 1 disk, teacher's guide (12p.), reproducible worksheets (32), stickers (60)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Atari, IBM PC

Version: 1983
Display Language: English
Cost: $59.95 (1985)
Tel. #: (519) 658-4621
Users: Grades 3+

OBJECTIVES

This program is designed to increase a student's competency in spelling and vocabulary development.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of two spelling games with six vocabulary levels for one to four players. The words in level A begin with simple words such as "into", "soak", "body", etc., and become progresssively more difficult with Level F containing such words as "eruption", "trajectory", etc. The Pop'R Spell Challenge game contains words such as "bacterium", "egalitarian", "volition", etc. which are intended to challenge users of any age. Both games consist of a mystery word, and the players in turn must select a letter which might fit the mystery word from three letters which are presented. Points are awarded for correct letter and correct spelling of the mystery word with the first person reaching one hundred points being the winner. An explanation of the rules of the game may be accessed before starting the game, if they are required.

PEDAGOGICAL CONTENT EVALUATION

This program is in a game format with no instructional component. One analyst noted that it is difficult for the younger target audience (grade four) to complete a game with a declared winner in one sitting. However, the students found the program stimulating and interesting and they were willing to continue. There is an increase in difficulty from Level A to Level F in Pop'R Spell; however, there does not always appear to be a logical progression. The depth of the program is appropriate in that a great deal of practice is provided with a large variety of words. It is noted that a few non-metric words such as gallon, inch, etc., are used. The games are well suited to computer use and the format is motivating to the users.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entries of menu selection, name and initials, Y or N for sound, RETURN key for page turning, SPACE Bar for passing a letter, ESC key for accessing the mystery word or leaving the program, P to pop a letter, S to spell a word, and actual letters for the words. The student has the option of accessing the instructions for the games.

The spelling words are selected randomly from a sizeable word bank at each level. The three letter choices which are used in the Pop portion of the game are randomly generated from the letters of the alphabet.

Feedback for a correct response consists of an audio beep and the letter appearing in the correct place in the mystery word. Points for the letter are added to the player's score and the scores are always displayed on the screen. If a complete word is spelled correctly, the student is rewarded with a personalized congratulatory message. An incorrect response results in an audio buzz and a turn is lost to the opponent. Points are also deducted for the error. At the completion of the game the winner's name is stated. The players' scores are presented with the number of words correct out of the number presented.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate and effective. The time limits maintain a lively pace while allowing enough time to make decisions and find the letters on the keyboard. The random selection of words within each level is appropriate for the game format. It would be beneficial for the teacher to have a list of all of the words in the program and to be able to add to these. It is noted that with the student choosing a correct letter, from the three presented, that often letters are presented which already appear in the mystery word. This may result in many turns being used to no avail and thus some computer time is wasted. The use of the ESC key is useful when the student is having difficulty with guessing the word. This allows the student the option of seeing the completed mystery word. The feedback which is immediate and non-threatening is appropriate. The constant updating of the scores on the screen is a good feature.

TECHNICAL CHARACTERISTICS DESCRIPTION

Regular upper and lower case print is used in the instructions while enlarged print is used in the games. Inverse is used for the letter choices. Color graphics are used in the corn popper. Sound is optional.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are clear and effective on both color and monochrome monitors. The size of print and use of upper and lower case letters are appropriate. The use of the graphics adds interest to the game format. The sound may also add interest to the games, but may be turned off if it becomes distracting. A weakness in the technical design is noted when popping letter choices do not have at least one letter that might fit the mysterv word. This is frustrating to the user and also wastes some computer time.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No special entry competencies are indicated.

The management system is an optional feature in this program. A record of a student's scores is kept under the student's initials. The records include the number of words played, the level and the number correct. Scores can be retrieved for individual students or for each game with the most recent scores appearing first. The management system can be accessed by pressing zero when the menu page appears.

The documentation includes objectives, use of the management system, student use of the reproducible hand-outs, and extension and enrichment activities.

The user materials consist of thirty reproducible sheets for student work, answers and certificates. Sixty stickers are also provided. The user support materials are optional to the program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system works as described and automatically records the information under the student's initials. The management system is very easy to use; however, the use of student names rather than initials would be much easier for teacher use. Since this program is in a game format, the effectiveness of the management system is questionable. The information which is provided does not really give the teacher any valuable information pertaining to the student's spelling competency especially as the game involves guessing. Another disadvantage is that the student scores are not in alphabetical order.

The teacher documentation is weak. Five of twelve pages deal with enrichment activities for other programs that are not on this disk. The user support materials are satisfactory and may be used to enhance the program.

SUMMATION

The major strength of this program is the game format with its motivational capability. It makes practicing spelling skills fun. The computer is used to an advantage as the graphics add interest. The use of sound as an option is a good feature, if the program is used in a classroom setting. However, the teacher documentation is weak and incomplete, the randomized choices of three letters in the popping section need to be improved to assure that at least one of the letters fits the mystery word and the use of initials only in the management system is also a weakness.

STATUS

"Pop'R Spell and Pop'R Spell Challenge" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $59.95 (1985) from Britannica Learning Materials at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software or Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

SENTENCE COMBINING I

DESCRIPTION

Title: Sentence Combining I
Author(s): IOTA Inc & Milliken Publishing Company
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Adjectives, adverbs, prepositions, conjunctions, possessives, subject/verb agreement
Components: 3 disks, teacher's guide (23p.), reproducible masters book (48p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1984
Display Language: English
Cost: $157.50 (1985)
Tel. #: (519) 658-4621
Users: Grades 4 - 8

OBJECTIVES

This program is designed to teach skills in three areas of writing: sentence sense (knowing the minimal essentials for sentence making and distinguishing sentences from non-sentences); sentence fluency (combining appropriate parts to write more sophisticated and more communicative sentences); and selected usage and transcription skills (knowing adverb form, pronoun form, subject/verb agreement, possessives and basic comma rules). Instructional objectives are included within each lesson.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of three disks, two of which include lessons one to eighteen and the third containing the challenge material. This program provides instruction and practice in developing the ability to write better and more communicative sentences. The lessons cover sentence combining using concepts which involve multiple subjects, multiple predicates, adjective and adverb identification, use of of "good" and "well", the use of co-ordinating conjunctions, use of possessives, use of relative pronouns, subject/verb agreement, use of subordinate conjunctions and use of multiple combinations. Since the skills are cumulative, it is recommended that students not skip any of the lessons. Five of the eighteen lessons are for review purposes.

Each lesson, with the exception of review lessons, has a tutorial which explains each lesson and is followed by examples of how to combine the sentences and gives rules to illustrate the concept. The student is given sample exercise(s) to do and then has the option of reviewing the tutorial before going into the practice portion of the lesson which usually has five to eight exercises. Most of the exercises involve combining sentences by moving a graphic box or by erasing words with an animated graphic pencil. Of the five review lessons, three cover specific prior lessons, and two are cumulative and consist of multi-combinations.

The Challenge Sentence Combining program provides a set of sixteen problems which review the concepts taught in Sentence Combining I. This program allows the students to use the word processor to type their own answers to sentence combining problems. The teacher has the option of inputting sentence sets.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence of content in Sentence Combining I are appropriate for the target audience. The lessons are of suitable length to enable the user to complete the task and still retain interest. The quality of the tutorials vary with some tutorials being more explanatory than others. Although the order of lessons is optional, it is recommended that all lessons be done by all students. The depth of the program is limited by the data bank which consists of ten or twenty sentence combinations, depending on what format is used. Although the questions are randomly generated, they will be repeated if the student is having difficulty. The additional practice that can be provided through the drill function is useful, but with the limited data base some students may memorize the correct responses. It is noted that usually only one or two examples are provided in each lesson. If a student is having difficulty, (s)he can go over the examples again; however, they are always the same. Although the content included on the Challenge disk is limited in depth, the teacher is able to alter the set of default sentences or replace them with other sentences to provide more practice.

The content is accurate with factual and appropriate responses on the first two disks; however, more correct responses could be offered where several alternatives are possible in the Challenge program. The vocabulary, sentence structure, length and general readability all appear to be suitable.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of name, grade number and password entry; menu selection; manipulation of boxes, sentence parts, punctuation and graphic symbols; page turning using SPACE BAR and RETURN key; ESC key for automatically updating a student's record; and use of assorted character keys for responses. In the Challenge program the students input sentences in upper and lower case letters using the word processor which provides on-line instructions.

A variety of question formats are used with sentences selected from a limited data base consisting of ten or twenty questions, depending on the format, while in the Challenge program the data bank is limited to sixteen sentence combination problems.

There is little or no feedback during the guided lesson. In the rest of the program, positive and negative feedback is generally in a graphic and/or textual format. A correct response is rewarded with a star in a box and sometimes a personalized congratulatory message. The negative feedback sometimes has an "X" over the incorrect response and/or a textual message indicating a wrong response; then the student is given the correct response or is given another chance. After a second error, the correct response is always provided. If a student fails three consecutive lessons, the program is frozen and the student must see the teacher. No quantitative feedback is given to the student; however, the student is told whether (s)he passed or failed that lesson. Quantitative information is provided for the teacher in the management system. In the Challenge program, students are shown a corrected version of combined sentences but no other feedback is provided.

There is both a pre-test and a post-test provided for optional use. Five review lessons are also provided. Branching exists only in the form of referral to instruction and the opportunity to repeat examples and drills.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction for most of the program is appropriate; however, there is too much page turning with too little interaction in the initial part of the lessons. Furthermore, the student could pass through this part of the program quickly by merely pressing the space bar. The instructions for each set of questions are appropriate, but some students were confused over the difference in input methods - sometimes the space bar is used to complete an input, sometimes the return key is used. This can be an irritating inconvenience when student records are graded erroneously.

Questioning techniques appear to be appropriate and effective for the target audience and are consistent with formats used by many classroom teachers. The limited data bank is a weakness.

The positive feedback is appropriate and effective with the graphics adding interest, but the negative feedback is weak. The use of the "X" in the negative feedback could be improved and, in most cases, there is insufficient assistance provided with incorrect responses. Quantitative feedback at the end of each lesson would be beneficial to the student.

Review lessons can be used as means of evaluating student progress, but they do not always provide sufficient coverage to be valid.

TECHNICAL CHARACTERISTICS DESCRIPTION

Upper and lower case print is used in this program with the text varying in size. Graphics are used in the Sentence Combining disks with color being used only in the graphics reward after the successful completion of lesson eighteen. The Challenge program contains a word processor which features the use of upper and lower case letters, cursor movements, deletion of characters, wrap around of words, etc. No sound is used in any of the programs.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are generally clear and uncluttered with suitable font and character size. Upper and lower case letters are used appropriately. The use of graphics in Sentence Combining I is effective and helpful in developing some of the concepts and retaining student interest. Prompts provide a clear indication of required user input. The Challenge program contains a word processor which can be used readily by the students. The scrolling instruction page is somewhat difficult to read. The initial booting of the program is slow. Most students should be able to use the program without a great deal of assistance.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No entry competencies are indicated, but a student orientation to the program is suggested.

The optional management system in Sentence Combining allows the teacher to make individual assignments, review individual and class performance and receive printed records of student performance. The management system in the Challenge program allows the teacher to review student progress and/or read the student sentences, print out student records or sentences, and create or edit sentences. A maximum of one hundred students in up to five classes in Sentence Combining and up to eight classes in the Challenge program can be accommodated. A password is used to provide security. A special drill feature enables unmanaged lesson activities for students for practice purposes.

The teacher documentation includes a rationale and introduction to the program, a lesson overview, scope and sequence information, implementation and extension activities, operating instructions for use of the management system and drill feature, student orientation, optional testing and record keeping materials, duplicating masters for student user schedules and an "Easy-Does-It" card to be used as an operating guide. A book with reproducible masters is provided for student use. Each computer lesson, excluding the Challenge disk, corresponds to two reproducible masters.

IMPLEMENTATIONAL SUPPORT EVALUATION

The suggested student orientation is a good idea and will likely save the teacher considerable time. Some of the younger target audience may have difficulty using the program without this initial assistance.

The management system is relatively easy to use, appears to function well and has an adequate capacity. If the management system is used, the teacher must be prepared to spend some time entering the student names, making assignments and inputting sentences in the Challenge program when this option is chosen. The drill feature is useful in providing practice. Two weaknesses are noted in the management system: if a student quits a lesson and does not press the ESC key, the results are lost; and the management system does not indicate whether a student passed a lesson on the first try or if in fact it took several tries. This information would be useful to the teacher.

Teacher documentation is complete and easy to follow. Student support materials are relevant and easy to use for most of the target audience. The program can be used by teachers with minimal computer competency, provided the documentation is read carefully.

SUMMATION

The technical quality and the management system are major strengths of this program. The utilization of the computer to allow students to visually observe sentence parts being manipulated is a good feature. Graphics are effective in teaching some of the concepts and maintaining student interest. The ability of the teacher to input sentences in the Challenge program is a very good feature.

The weaknesses in the program include the following: poor student interaction in the first part of the tutorials with too much page turning and too little interaction, a limited data bank, difficulty with use of the return key and space bar in some of the programs causing questions to be considered incorrect when in fact they were not, the lack of sufficient assistance with negative feedback and lack of quantitative feedback to the student.

It is essential to have the updated documentation (1984) to go with this program in order to make proper use of the Challenge program.

STATUS

"Sentence Combining I" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $157.50 (1985) from Britannica Learning Materials at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

SENTENCE COMBINING II

DESCRIPTION

Title: Sentence Combining II
Author(s): IOTA Inc & Milliken Publishing Company
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Developing sentence writing skills
Components: 3 disks, teacher's guide (34p.), reproducible masters book (32p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1984
Display Language: English
Cost: $157.50 (1985)
Tel. #: (519) 658-4621
Users: Grades 6 - 9

OBJECTIVES

This program is designed to teach skills in three areas of writing: sentence sense (knowing the minimal essentials for sentence making and distinguishing sentences from non-sentences); sentence fluency (combining appropriate parts to write more "adult" and more communicative sentences); and selected usage and transcription skills (knowing adverb form, pronoun form, subject/verb agreement, possessives and basic comma rules).

PEDAGOGICAL CONTENT DESCRIPTION

This package consists of three disks, two of which include lessons one to twelve of the Sentence Combining program and the third disk containing the Challenge program. This program provides instruction and practice in developing sentence sense and writing more communicative sentences with an emphasis on modeling, interaction, practice and mastery. Wherever possible, grammatical concepts are demonstrated through visual modeling. The sequence of skills begins with structures that build upon some of those emphasized in Sentence Combining I; however, it is not necessary to have completed Sentence Combining I in order to do this program. The first three lessons deal with the flexible word order of adverbials, the use of subordinating conjunctions and the use of relative pronouns. Each of these lessons begins with review. The subsequent lessons include participial phrases as modifiers and nominals, appositives, connectors with a semicolon, "that" as a subject, pronoun forms, active and passive voice, and recognizing and correcting run-on sentences. Since the skills are cumulative in nature, it is recommended that students not skip any of the lessons.

Each lesson, with the exception of the Challenge Sentence Combining, has a short tutorial which introduces the sentence skill to be taught with a sample demonstration in which the computer visually manipulates various sentence parts to create a new combined sentence. The student is then required to do an exercise(s) based on the demonstration. The student has the option of reviewing the tutorial before going into the practice portion of the lesson which usually has six to eight exercises with a required mastery level preset by the teacher.

The Challenge program provides a set of sixteen problems which review the concepts taught in Sentence Combining II. This program allows the students to use the word processor to type their own answers to the sentence combining problems. The teacher may input sentence sets in order to reinforce sentence combining techniques, provide intensive experiences with particularly troublesome principles or sentence structures, and provide continuous experience combining a variety of interesting and meaningful sentences.

PEDAGOGICAL CONTENT EVALUATION

The content range and sequence are appropriate for the target audience. The lessons are of suitable length to enable the user to complete the task and still retain interest. The quality of the tutorials vary in that some tutorials are more explanatory than others. Although the order of lessons is optional, it is recommended that no lessons be skipped. The content depth is adequate for most students; however, the program may not provide sufficient effective practice for the students requiring more assistance. With the limited data bank of ten or twenty questions per lesson, the questions, randomly generated, will be repeated when a student requires a great deal of practice. The additional practice that can be provided through the drill function is useful.

It is also noted that usually only one or two examples are provided in each lesson. If a student is having difficulty, (s)he can go over the examples again; however, they are always the same. The depth of content provided in the Challenge program is limited, but the teacher is able to alter the set of default sentences or replace them with other sentences to provide more practice. This feature adds strength to the program.

The content is accurate with factual and appropriate responses on the first two disks; however, more correct responses could have been offered where several alternatives are possible in the Challenge program. The vocabulary, sentence structure, length and general readability all appear to be suitable.

INSTRUCTIONAL FORMAT DESCRIPTION

No pre- or post-tests are provided. Branching exists only in the form of referral to instruction and the opportunity to repeat examples and drills.

See the report on Sentence Combining I for other pertinent comments.

INSTRUCTIONAL FORMAT EVALUATION

See the report on Sentence Combining I

TECHNICAL CHARACTERISTICS DESCRIPTION

See the report on Sentence Combining I

TECHNICAL CHARACTERISTICS EVALUATION

See the report on Sentence Combining I

IMPLEMENTATIONAL SUPPORT DESCRIPTION

See the report on Sentence Combining I

IMPLEMENTATIONAL SUPPORT EVALUATION

See the report on "Sentence Combining I"

SUMMATION

The technical quality and the management system are major strengths of this program. The utilization of the computer to allow students to visually observe sentence parts being manipulated is a good feature. Graphics are effective in teaching some of the concepts and maintaining student interest. The feature which allows the teacher to edit or create sentences in the Challenge program is an asset.

The weaknesses in the program include the following: poor student interaction in the first part of some of the tutorials with too much page turning and too little interaction, a data bank that is somewhat limited, the lack of sufficient assistance with negative feedback and lack of quantitative feedback directly to the student.

STATUS

"Sentence Combining II" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

See the report on "Sentence Combining I"

STICKYBEAR OPPOSITES

DESCRIPTION

Title: Stickybear Opposites
Authors: None cited
Publisher: Weekly Reader Family Software (Xerox)
Source: c/o C.P.R. Software Distributors, P.O. Box 431, Brantford ON N3T 2J0
Subjects: Language Arts, Early Childhood
Topics: Opposites
Components: 1 disk, teacher's guide (4p.), book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $49.95 (1984)
Tel. #: (519) 756-7198
Users : Ages 3 to 6

OBJECTIVES

This program is designed to:

1. introduce and reinforce the concept of opposites.
2. familiarize young children with the computer by encouraging exploration, discovery and hands-on experience.

PEDAGOGICAL CONTENT DESCRIPTION

This program uses high resolution, colored, animated graphics and sound to portray one of twenty-three pairs of activities. By using the paddles or by pressing certain keys the student can change the animated display to portray an opposite activity (e.g. a glass emptying and filling, a car going forward or backward, etc.) or a companion activity (e.g. having the concept of "up" and "down" illustrated by a bouncing ball and by a companion activity of a seesaw in motion). Each display has a name on it such as "high" or "low", "short" or "tall", etc.

User support materials include a "Yes and No" hardcover book, a poster, and eight stickers to help reinforce the concept of opposites.

PEDAGOGICAL CONTENT EVALUATION

Content range and depth are suitable for use with the specified target audience as well as with older students experiencing language delays. The animation effectively illustrates the concept of opposites even through younger children may not be able to read the words. The program is linearly sequenced with no progression from easy to difficult.

User support materials help extend the concept of opposites into the child's environment.

INSTRUCTIONAL FORMAT DESCRIPTION

Student's have the option of using game paddle or keyboard input. If the keyboard is used the space bar is used to activate a new set of opposites while using the left or right arrow key, the numbers 1 and 2 or the letters "O" and "P" will produce the companion opposites.

Feedback is immediate and consistent but is not in the common form of a congratulatory message. Rather, if the student presses the correct key (s)he is rewarded by having the opposite activity initiated. Sequence is program controlled while rate and amount are user controlled. The program will endlessly draw random samples from its bank of twenty three pairs of opposites. The student terminates the program by shutting off the computer.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate for the age group. Questions are randomly chosen from a limited data base. No quantitative feedback is provided. The instructional technique is sound in that it effectively helps a child move from the concrete toward the abstract in grasping the concept of opposites in an interesting and motivating way. The program should provide the option of continuing after each of the pairs of activities have been displayed, otherwise some students will continue indefinitely.

TECHNICAL CHARACTERISTICS DESCRIPTION

The program uses high resolution, animated, colored graphics and sound. Combination upper/lower case, large size lettering is used.

TECHNICAL CHARACTERISTICS EVALUATION

The high resolution graphics complete with animation, color, audio and text are appropriate and effective for the intended audience. Although using a color monitor adds interest to the program, its use is not mandatory.

Displays are clear and well formatted and transition from one to another is smooth. Sound forms an integral part of the feedback, and so unfortunately can not be turned off. Its presence may be distracting in the classroom.

SUMMATION

This program makes excellent use of high resolution graphics to effectively convey the notion of opposites in an interesting and motivating way.

STATUS

"Stickybear Opposites" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.95 (1984) from C.P.R. Software Distributors at the address given at the beginning of the report. Warranty information was not available at publication.

In Alberta, the product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

THE SPELLING SYSTEM

DESCRIPTION

Title: The Spelling System
Author(s): IOTA Inc & Milliken Publishing Company
Publisher: Milliken Publishing Company
Source: c/o BLM, P.O. Box 2249, 175 Holiday Inn Dr., Cambridge, Ontario N3C 3N4
Subject: Language Arts
Topics: Vowel spelling, consonant spelling, special vowel spelling, word builder
Components: 4 disks, teacher's guide (39p.), reproducible masters book (72p.)
System Requirements: Apple II+/IIe/IIc 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $292.50 (1985)
Tel. #: (519) 658-4621
Users: Grades 4 - 8

OBJECTIVES

This program is designed to increase student knowledge and the use of spelling principles and patterns in a variety of contexts.

PEDAGOGICAL CONTENT DESCRIPTION

This program, on four disks, introduces principles which relate to the target lesson words, practices the target words in a variety of contexts, and then tests the words in contextual sentences. A manager program is included on each disk. Disk one (lessons one to eight) covers short and long vowel spellings. Disk two (lessons nine to sixteen) covers consonant spellings including the doubling of consonants; spelling involving k, s, j, q, and x; silent consonants; homophones and confusing pairs. Disk three (lessons seventeen to twenty four) includes special vowel spellings covering patterns such as oi/oy, ou/ow, aw/au, augh/ough, or/our/ar, air/are, eer/ear, er/or/ar and el/le/al. Disk four (lessons twenty-five to thirty) deals with word building including changing y to i, prefixes, suffixes, more suffixes and compound words. Each disk also contains a "Wonder Words" lesson which presents "bug words" or a teacher's own practice words. "Bug words" are high frequency, highly irregular words that follow no pattern. Each lesson, with the exception of the Wonder Words lessons, consists of three basic parts: (1) facts, (2) practice, and (3) ready, set, spell. Facts is intended to be a tutorial and it presents a few statements or principles which direct attention to the features of the target lesson words. This may relate a sound to a spelling, make an observation about a rule, point out some historical item, or isolate "bug words". Practice in each lesson is provided by three different unscored practice formats with a total of ten to twelve formats used for the total disk. A student may choose to do all the practice formats, or none of them until performance on the testing section shows that practice is required. Ready, Set, Spell is the testing section of each lesson. Twelve contextual sentences are presented and the student must spell the lesson words that are missing from the sentences successfully in three or less tries. Two helps for identifying the target words may be used: seeing the complete sentence before the student begins the test, and calling up the phonetic spelling of the target word in a given sentence. Mastery criteria is set by the teacher. Each lesson contains two levels of word lists: one for grades four and five, the other for grades six, seven and eight. The total program, including the user materials, presents over fourteen hundred words.

PEDAGOGICAL CONTENT EVALUATION

The content range, sequence and depth are appropriate and effective in achieving the intents of the program. Flexibility in the program allows the student to enter the program in various places such as facts, practice or spelling test. Since each lesson on a disk deals with specific spelling facts or patterns, the student has the option of choosing the order of lessons; however, the teacher can also specify the lessons. Generally there is little or no overlapping of the lessons to cause any problems in sequencing. The student has the option of viewing the facts for each lesson as many times as is felt necessary. Sufficient practice, in a variety of interesting formats, is provided for those students who choose this option.

Allowing the teacher to add practice words in the Wonder Words lesson is a good feature; however, it is unfortunate that the words are limited to nine characters. The content appears to be accurate, readable, relevant and free of bias.

This program is appropriate for computer use and provides a stimulating and novel way for students to learn and practice spelling words.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entries of name, class number and password, menu selection, RETURN and SPACE BAR for page turning, ESC key to leave the program, and word inputs for the practice and spelling test sections.

Questions within each lesson, in both practice and testing, are chosen randomly from a data bank limited to twelve spelling words.

In the practice section, feedback is provided after every user response. Correct responses result in a graphic reinforcement, some include a type of scoreboard in which correct responses move the score. Incorrect responses usually result in a textual comment with the correct spelling provided; however, in some activities such as "File It", the student receives a textual comment and is able to try a second time. None of this feedback information is retained by the program. In testing, feedback is provided only at the end of the test and indicates whether the student is successful in passing the test and lists any words which are misspelled.

Two pre-tests are available for each disk, one for each level. Post-tests are provided at the end of each lesson. The criteria for success is determined by the the teacher who sets the passing mark between eight and twelve out of twelve. No branching is provided in this program.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate and effective with students interacting easily with the program; however, in the tutorial, the student's role is somewhat passive. This program includes a variety of activities to provide practice and promote learning of spelling skills in a interesting way. The use of graphics assists in making the program more motivating for younger students; however, some of the older students may find some of the graphics boring after using the program a few times. The student may enter the program at the tutorial, practice, or may go directly to the testing. The time required to complete the lessons is suitable for most of the target audience, but some students may find the practices slow. The questioning techniques are appropriate. The teacher has the opportunity to add enrichment or other words to meet individual student needs. These words are somewhat limited by the fact that they must not exceed nine characters. In the testing, providing phonetic cues is a questionable approach since this is sometimes the actual spelling of the word.

The feedback is generally appropriate and effective. In the practice exercises, the feedback indicates a measure of success through graphic presentation; however, it may be beneficial for the student to have quantitative feedback with all exercises. It is unfortunate that more assistance in not given with the negative feedback in the practice exercises. Quantitative feedback provided in testing is useful, appropriate, and is retained in the management system.

The evaluative techniques are effective for both the student and teacher. The teacher has the opportunity to set the mastery criteria for the tests. The pre- and post-tests are well designed and cover the content well. The words that are misspelled on the tests are listed and the lists are helpful in planning remedial work.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in both normal and larger than normal print using upper and lower case letters. Instructions generally appear in upper case letters. Flashing, inverse and underlining are used to emphasize parts of words in various lessons. Color graphics are used in the practice exercises. No sound is used.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality of the program is good. The displays are clear, well-organized and easy to read. There is a clear indication when inputs are required. The color in the graphics is excellent, but the color in the print statements are not as easy to read as on a monochrome monitor. The graphics are appropriate and motivating for the younger target audience; however, they may become boring for older students. It is unfortunate that this is not an option in the program. It is noted that if TAB is pressed when the title page is on the screen, the program goes into the initialization menu. Since this could allow the student to obtain a teacher's password and review records, it would be beneficial to eliminate this possibility.

The program, which is reliable and bomb proof under normal use, is user friendly with students experiencing little difficulty in its use. Using the suggested student orientation for the introduction of the program is a good idea.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No special entry competencies are required; however, a student orientation to the program is suggested.

The management system enables the teacher to make individual assignments, add/delete students or classes, review individual and class performance, receive printed records of student performance and input words in the Wonder Word lessons. The system has the capacity of one hundred students with a maximum of five classes. Security is provided by a password. The teacher also has the option of using the program without the management system.

The teacher documentation provides a rationale for the program, a lesson overview, suggestions for individualization, sources of the word lists, two pre-tests for each disk, a scope and sequence chart showing the topic covered and the patterns taught, suggestions for implemention and extension activities, operating instructions, management system use, student orientation, use of drill feature, lesson descriptions and word lists. Two reproducible sheets are provided, one for a class schedule and the other for a class evaluation chart. An "Easy-Does-It" sheet is provided as a student operational guide for using the program. Support materials for each lesson are provided in the reproducible masters which accompany the program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is effective and relatively easy to use, if the documentation is read carefully. It will take some time for the teacher to input the student names and make assignments; however, this time is worthwhile in view of the valuable information provided for the teacher and time saved in tracking student progress. The capacity of the system is adequate for most users.

The teacher documentation is clear, detailed, useful and generally easy to follow. The user materials are useful, relevant and can be used at the teacher's discretion. The reproducible sheets provide supplementary activities which the students should find interesting.

The program is easy to implement and requires minimal teacher computer competence. If the suggested orientation is done before the students use the program, only a minimal amount of teacher supervision will be required.

SUMMATION

The content range, sequence and depth are appropriate and effective for the target audience. The variety of practice formats with their graphics and animation provide interest and incentive. The management system, user materials and teacher documentation all add strength to the program. The pre- and post-tests are useful evaluative tools.

The student interaction is somewhat weak in the tutorial in that the student is only involved in reading and page turning. It is unfortunate that the teacher can input spelling words with no more than nine characters. The lack of assistance with negative feedback is also a disavantage.

STATUS

"The Spelling System" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $292.50 (1985) from Britannica Learning Materials at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced for $15 within a 1 year warranty period.

In Alberta, the product may be purchased from the Britannica Learning Materials sales representative (Bev Horan, (403) 458-9264) or from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

WORKING WITH WORDS

DESCRIPTION

Title: Working with Words
Author(s): Custom Micro Systems Ltd.
Publisher: Custom Micro Systems Ltd.
Source: 16921 - 108 Street, Edmonton, Alberta T5X 3B2
Subject: Language Arts
Topics: Initial consonants & blends, medial vowels & dipthongs, final consonants & blends
Components: 1 disk, teacher's guide (23p.), program guide (40p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore 64

Version: 1985
Display Language: English
Cost: $69.95 (1985)
Tel. #: (403) 456-0974
Users: Grades 1 - 3

OBJECTIVES

This program is designed to develop an understanding of the sound-symbol relationship, to assist in the application of phonics to word analysis skills, to provide immediate application of word analysis skills in context, to reinforce left to right eye movement and to increase reading speed.

PEDAGOGICAL CONTENT DESCRIPTION

The five parts in this drill and practice program cover initial consonants, initial blends, medial vowels, dipthongs, final consonants and final blends. The number of sentences in each part ranges from a maximum of forty-seven on final consonants to one hundred seventy sentences on medial vowels. The level of difficulty appears to be approximately the same throughout most of the drills; however, the drills on medial vowels and dipthongs appear to get progressively harder.

All drills follow the same general format. Three similar target words which differ only in one respect, e.g. initial consonant, are presented individually for a period of time set by the teacher. After all three words have been presented, a simple sentence appears on the screen with a blank indicating a missing word. The three target words are numbered and appear beneath the sentence. The student is required to select the word which fits the blank. The student must continue to respond even if it takes three tries to get the correct answer, otherwise (s)he cannot go on to the next question. When the correct response is chosen, it appears in the blank and the student is instructed to read the sentence. Students progress indefinitely through the questions in the assigned topic without interruption, regardless of the performance. The Update program on this disk permits the teacher to make modifications to the program by altering, adding-to or creating new data.

PEDAGOGICAL CONTENT EVALUATION

This program covers five phonetic skill areas which are appropriate for the target audience. The range is good; however, a breakdown of the program into a greater number of subtopics would allow more effective use of the program. The word presentation at the beginning of each question is very good in that it focuses the student's attention on the differences between the words being used in that sentence. The sequence follows a logical order and is generally suitable for the intended audience but the progression of difficulty is limited. The depth of the program is adequate with sufficient questions to provide fairly comprehensive practice in the skills covered.

Although exercises dealing with phonetic skills can be done on paper, the computer adds an important dimension. The initial word presentation and the teacher control of the speed of text presentation are valuable functions.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of reading each of the three words presented, inputting a response by typing 1, 2, or 3 for the word that goes into the blank, reading the completed sentence and pressing the RETURN key for page turning. All questions in this program are preprogrammed from a limited data bank and follow a set order.

Feedback is presented each time the student enters a response. If a student responds correctly, a short congratulatory message is given, the correct answer is presented in the sentence and the student is directed to read the completed sentence. If an incorrect response is given, an "x" appears before the incorrect word and the student must try again. No quantitative feedback is provided to the student other than an indication of number of sentences completed and number of answers entered to the point when the student ended the program. Other quantitative information is stored in the management system. There are no pre- and post-tests or branching provided in this program.

The teacher controls which skills the student will practice and is able to set the rate of presentation and preset the starting sentence. The amount is user controlled with no set number of questions defined.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is simple, straightforward and appropriate for the target audience. Clear indication is given when responses are required and the students can interact with the program easily.

The questioning techniques used by the program are appropriate to the content of the program. There are sufficient questions with the number of trials for each question being satisfactory. As there is no sequence from easy to hard, randomization would have been advantageous.

The feedback is adequate. It would be helpful to have more assistance as part of the negative feedback as well as quantitative feedback for the student at the end of each sitting.

The control functions of this program are generally good. The teacher control of skills to be practiced and the speed at which text is presented on the screen is a strength. It is unfortunate that the management system does not allow the teacher to limit the amount of material presented during one program sitting; a student keeps on until the teacher directs him/her to stop or the student quits on his/her own accord. As a result the teacher must implement some procedure for the lack of question limits such as a time limit or use the "?" function, both of which are not very satisfactory.

TECHNICAL CHARACTERISTICS DESCRIPTION

The program uses enlarged primary print with both upper and lower case letters. The instructions are presented in standard size upper case letters. The rate at which text appears on the screen is controlled by the teacher through the management system. Some selective erasing is used and letters and words are moved from one place to another on the screen. No sound or color is used.

Students are able to exit from the program and return to that point later, with all data being recorded. This program can be used with only one computer at the time.

TECHNICAL CHARACTERISTICS EVALUATION

The technical quality is good. Screen clarity is excellent and the enlarged print is appropriate. The screen is uncluttered and a clear indication is given when input is required. The fact that the teacher controls the speed at which text appears on the screen is a very good feature and adds to the program's instructional value. The student's ability to continue a program from the exit point is a strength. Color and sound are not required in this program. The use of the ESC key is somewhat confusing; in some cases it returns to a menu while in other cases it terminates a function. The use of a password to terminate the program has questionable value. Most students will find the program easy to use.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

No special competencies are noted.

The management disk has a capacity of twenty-six students in each of the five phonetic skill areas (a total of one hundred thirty records). The teacher gains entry to the management functions through a password system. The management system allows the teacher to browse through the sentences used in various exercises, to add/delete students, to clear records, to review student performance in one or more topics, to reset the password, to terminate the program, to assign the student work and begin the lesson sequence. The management system provides the teacher with a summary of performance on the most recently completed assignment as well as a cumulative summary of the work done in a particular skill. The summary consists of the number of sentences that have been covered on the topic and the number of errors that have been recorded. The Update Program permits the teacher to alter, add-to or totally replace the phonetic material.

A twenty three page document includes information on the program with specific reference to the use of the management system and the Update program. A forty page preliminary guide includes a background of the program, the instructional purpose, curriculum relevance, a list of words used in each topic referenced to the Nelson Language Development Reading Series as to reading level and a list of the sentences used in each topic in the program. The objectives are listed on a single sheet. No user support materials are provided.

IMPLEMENTATIONAL SUPPORT EVALUATION

The automatic updating of records, the ability for the teacher to set the speed at which text will be presented, the browse capability and the relative ease with which the system can be used, once the passwords and control functions have been learned, are strengths in the management system.

Weaknesses include:

1. Some teacher time is wasted. Instruction can only begin through the management system and the teacher can not preprogram assignments.
2. It would help the teacher to have the management system provide a record of the types of student errors.
3. The teacher is unable to set performance standards which would prevent a student who is having difficulty from carrying on indefinitely in the program.
4. The inability of the teacher to set the number of questions to be done in a sitting is also a disadvantage.
5. Students are not listed alphabetically.

The documentation is relatively comprehensive; a short summary of the steps required to use the Update program may help to save some teacher time. The program is relatively easy to use, but considerable teacher time will be required to take full advantage of the Update program and management system.

SUMMATION

While the Update program permits the teacher to alter the content, a great deal of teacher time would be involved not only for learning how to use the system and then making the changes but also for the planning that would have to be done to ensure appropriate content development. As a result, while a revision facility is available, prospective purchasers would be advised to judge the program on its present merits.

A major strength of this program is that the phonetic skills which are covered are closely related to the requirements of most primary reading programs with the range, sequence and depth of content generally being appropriate. The program is straight forward, easy to use and it provides appropriate drill and practice for the intended audience. The technical quality is generally very good.

A weakness is noted in the content area in that the five phonetic skill areas are too broad and the sequence from easy to difficult has not been developed as well as it could be. In addition, the inability of the teacher to limit the number of questions a student is to do in one sitting, the inability to preprogram assignments, the inability to give class assignments, the lack of information on the type of student errors, the need to go through the management system to initiate the drill and the necessity of a password to terminate the drill will all affect the ease of use in the classroom. The weakness in quantitative feedback to the student and lack of assistance with the negative feedback are further disadvantages to the program.

STATUS

"Working with Words" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

As of the publication of this report, this product could be purchased for $69.95 (1985) from Custom Micro Systems at the address given at the beginning of the report. However, other distribution channels have been planned and prospective purchasers may wish to phone Custom Micro Systems in order to determine the new source of the product. Warranty information from this new source was not available at publication.

LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
AHEAD DESIGNS	WORD DIVISION	0.0	40
AMERICAN EDUCATIONAL COMPUTER	DICTIONARY	0.0	40
AMERICAN EDUCATIONAL COMPUTER	VOL. 1 READING COMPREHENSION SKILLS	0.0	40
AMERICAN EDUCATIONAL COMPUTER	VOL. 2 READING COMPREHENSION SKILLS	0.0	40
AMERICAN EDUCATIONAL COMPUTER	VOL. 3 READING COMPREHENSION SKILLS	0.0	40
AMERICAN LEARNING CORPORATION	COMPREHENSION SKILLS I	0.0	60
AV CONCEPTS	LEVEL 10 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 2 CONTAINED READING	1983.0	41
AV CONCEPTS	LEVEL 3 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 4 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 5 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 6 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 7 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 8 CONTAINED READING	0.0	40
AV CONCEPTS	LEVEL 9 CONTAINED READING	0.0	40
AVANT GARDE CREATIONS	SENTENCE DIAGRAMMING	2.0	40
BEHAVIOURAL ENGINEERING	BEGINNING COMPOSITION STRATEGY	0.0	40
BEHAVIOURAL ENGINEERING	COMPOSITION STRATEGY	0.0	40
BEHAVIOURAL ENGINEERING	SPELLING STRATEGY	0.0	40
BERTAMAX	ALPHAKEY	0.0	60
BERTAMAX	LEVEL 1 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 2 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 3 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 4 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 5 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 6 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 7 SPELLING IN CONTEXT	0.0	60
BERTAMAX	LEVEL 8 SPELLING IN CONTEXT	0.0	60
BERTAMAX	STORY MIX 1 IVAR	0.0	40
BERTAMAX	STORY MIX 2 AT THE ZOO	0.0	40
BERTAMAX	STORY MIX 3 NURSERY MIX	0.0	40
BERTAMAX	STORY MIX 4 ANIMAL MIX	0.0	40
BERTAMAX	STORY MIX 5 GOING PLACES	0.0	40
BERTAMAX	STORY MIX 6 IN & OUT	0.0	40
BLYTHE VALLEY SOFTWARE	BRIAR ROSE	0.0	60
BLYTHE VALLEY SOFTWARE	HANSEL & GRETEL	0.0	60
BLYTHE VALLEY SOFTWARE	MILKYWAY MERCHANT	0.0	60
BLYTHE VALLEY SOFTWARE	THE STORY TELLER	0.0	60
BRAIN BANK	BASIC SKILLS PRAC. A	0.0	40
BRAIN BANK	BASIC SKILLS PRAC. B	0.0	40
BRAIN BANK	BASIC SKILLS PRAC. C	0.0	40
BRAIN BANK	BASIC SKILLS PRAC. D	0.0	40
BRAIN BANK	BASIC SKILLS PRAC. E	0.0	40
BRAIN BANK	BASIC SKILLS PRAC. F	0.0	40
BRAIN BANK	CLASSES OF NOUNS	0.0	40
BRAIN BANK	FOUR BASIC READING SKILLS	0.0	40
BRENT RESOURCES GROUP (PREV. BPI)	SPEED READING	1983.0	42
CANADIAN MICRO COURSEWARE	VOL. 5 VOCABULARY & SPELLING TUTOR	0.0	60
CANADIAN MICRO COURSEWARE	VOL. 6 VOCABULARY & SPELLING TUTOR	0.0	60

40-43: UNFAVORABLE EVALUATION RESULTS
50: PRODUCT HAS BEEN DISCONTINUED
60: UNABLE TO OBTAIN AN EVALUATION COPY
70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

PUBLISHER	TITLE	CPYRT.	CODE
CANADIAN MICRO COURSEWARE	VOL. 7 VOCABULARY & SPELLING TUTOR	0.0	60
CBS SOFTWARE	MICROSPEEDREAD	0.0	60
CEEDE	ACTION WORDS: THE PICTURE DICTIONARY	0.0	60
CEEDE	ANIMALS: THE PICTURE DICTIONARY	0.0	60
CEEDE	CONFUSING WORD PAIRS	0.0	60
CEEDE	HOW WE GO PLACES: THE PICTURE DICTIONARY	0.0	60
CEEDE	LEV. A PART 1 TURNING POINT	0.0	60
CEEDE	LEV. A PART 2 TURNING POINT	0.0	60
CEEDE	LEV. B PART 1 TURNING POINT	0.0	60
CEEDE	LEV. B PART 2 TURNING POINT	0.0	60
CEEDE	LEV. C PART 1 TURNING POINT	0.0	60
CEEDE	LEV. C PART 2 TURNING POINT	0.0	60
CEEDE	LEV1 FINDING INCONSISTENCIES READING COMPREHENSION	0.0	60
CEEDE	LEV2 FINDING INCONSISTENCIES READING COMPREHENSION	0.0	60
CEEDE	LEV3 FINDING INCONSISTENCIES READING COMPREHENSION	0.0	60
CEEDE	MULTIPLE MEANING	0.0	60
CEEDE	NEGATION	0.0	60
CEEDE	NOUNS & PRONOUNS	0.0	60
CEEDE	NUMBERS: THE PICTURE DICTIONARY	0.0	60
CEEDE	PARAPHRASING 1	0.0	60
CEEDE	PARAPHRASING 2	0.0	60
CEEDE	PARAPHRASING 3	0.0	60
CEEDE	PEOPLE: THE PICTURE DICTIONARY	0.0	60
CEEDE	PREFIXES	0.0	60
CEEDE	REGULAR & IRREGULAR VERBS	0.0	60
CEEDE	SPELLING BEE FOR SUPER TALKER	0.0	60
CEEDE	SYNONYMS & WORDS IN CONTEXT	0.0	60
CEEDE	THINGS AROUND US: THE PICTURE DICTIONARY	0.0	60
CEEDE	THINGS IN NATURE: THE PICTURE DICTIONARY	0.0	60
CEEDE	THINGS TO PLAY WITH: THE PICTURE DICTIONARY	0.0	60
CEEDE	THINGS USED TO EAT: THE PICTURE DICTIONARY	0.0	60
CEEDE	USE OF CAN & MAY	0.0	60
CEEDE	USES OF THE GERUND	0.0	60
CEEDE	WORD APPLICATIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	ADJECTIVE USE	0.0	60
CLASSROOM COURSEWARE COMPANY	ALPHA-BE4	0.0	60
CLASSROOM COURSEWARE COMPANY	ALPHABET	0.0	60
CLASSROOM COURSEWARE COMPANY	ALPHABETIZE	0.0	60
CLASSROOM COURSEWARE COMPANY	BASIC SIGHT WORDS	0.0	60
CLASSROOM COURSEWARE COMPANY	CAPITALS	0.0	60
CLASSROOM COURSEWARE COMPANY	CAPITALS & PUNCTUATION	0.0	60
CLASSROOM COURSEWARE COMPANY	COMPOUND SENTENCES	0.0	60
CLASSROOM COURSEWARE COMPANY	COMPOUND WORDS	0.0	60
CLASSROOM COURSEWARE COMPANY	COMPREHENSION	0.0	60
CLASSROOM COURSEWARE COMPANY	DEFINITIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	DIFFERENT WORD	0.0	60
CLASSROOM COURSEWARE COMPANY	DIGRAPH	0.0	60
CLASSROOM COURSEWARE COMPANY	ENDINGS	0.0	60
CLASSROOM COURSEWARE COMPANY	FASTREAD	0.0	60
CLASSROOM COURSEWARE COMPANY	GRADES 3-5 TOPIC SENTENCES	0.0	60

40-43: UNFAVORABLE EVALUATION RESULTS
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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
CLASSROOM COURSEWARE COMPANY	GRADES 6-9 TOPIC SENTENCES	0.0	60
CLASSROOM COURSEWARE COMPANY	GUIDE WORDS	0.0	60
CLASSROOM COURSEWARE COMPANY	HYPHENS	0.0	60
CLASSROOM COURSEWARE COMPANY	INITIAL WORD	0.0	60
CLASSROOM COURSEWARE COMPANY	LIKE WORD	0.0	60
CLASSROOM COURSEWARE COMPANY	MISSING LETTER	0.0	60
CLASSROOM COURSEWARE COMPANY	MISSING SENTENCE	0.0	60
CLASSROOM COURSEWARE COMPANY	PARTICIPLE	0.0	60
CLASSROOM COURSEWARE COMPANY	PRONOUNS	0.0	60
CLASSROOM COURSEWARE COMPANY	READING	0.0	60
CLASSROOM COURSEWARE COMPANY	RHYMING RIDDLES	0.0	60
CLASSROOM COURSEWARE COMPANY	SCRAMBLED SENTENCES	0.0	60
CLASSROOM COURSEWARE COMPANY	SCRAMBLED WORD	0.0	60
CLASSROOM COURSEWARE COMPANY	SENTENCE PARTS	0.0	60
CLASSROOM COURSEWARE COMPANY	SENTENCE SEQUENCE	0.0	60
CLASSROOM COURSEWARE COMPANY	SPELLING	0.0	60
CLASSROOM COURSEWARE COMPANY	SYLLABLES	0.0	60
CLASSROOM COURSEWARE COMPANY	WHO/WHAT ETC.	0.0	60
CLASSROOM COURSEWARE COMPANY	WORD/PHRASE PRACTICE	0.0	60
COLORADO CYPHERNETICS	VOCABULARY I, PLURALS, SENTENCES/TELL ME	0.0	40
COMPUTER ASSISTED INSTRUCTION	READING EFFICIENCY SYSTEM	1984.0	41
COMPUTER SKILL BUILDERS	PICNIC	0.0	40
COMPUTER SKILL BUILDERS	SHIP AHOY/WORD SCRAMBLE	0.0	40
CREATIVE CURRICULUM	ALASKAN GOLD	0.0	70
CREATIVE CURRICULUM	BUILDING THE TRANSCONTINENTAL	0.0	70
CREATIVE CURRICULUM	FIGHT FOR INDEPENDENCE	0.0	70
CREATIVE CURRICULUM	NORTH TO ALASKA	0.0	70
CREATIVE CURRICULUM	PHRASE READING I	0.0	60
CREATIVE CURRICULUM	PHRASE READING II	0.0	60
CREATIVE CURRICULUM	STEPS TO ADVANCED READING	0.0	60
CREATIVE CURRICULUM	WAR BETWEEN THE STATES	0.0	70
CREATIVE CURRICULUM	WESTWARD MOVEMENT	0.0	70
CUSTOM MICRO SYSTEMS	WORKING W. ANTONYMS GRADES 1-3	1983.0	41
CUSTOM MICRO SYSTEMS	WORKING W. ANTONYMS:GRADES 4-6	1983.0	41
CUSTOM MICRO SYSTEMS	WORKING W. SYNONYMS GRADES 1-3	1983.0	41
CUSTOM MICRO SYSTEMS	WORKING W. SYNONYMS:GRADES 4-6	1983.0	41
DATA COMMAND	ALPINE SKIER	1981.0	40
DATA COMMAND	BIG DOOR DEAL	0.0	40
DATATECH SOFTWARE SYSTEMS	CROSS/CROSS DOUBLECROSS	1983.0	41
DESIGNWARE	SPELLAGRAPH	1983.0	41
DESIGNWARE	SPELLAKAZAM	1983.0	41
DESIGNWARE	SPELLICOPTER	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	SPELLING WIZ	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	VERB VIPER	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	WIZ WORKS	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	WORD INVASION	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	WORD MAN	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	WORD MASTER	1983.0	41
DEVELOPMENTAL LEARNING MATERIALS	WORD RADAR	1983.0	41
DORMAC	LESSONS IN SYNTAX	0.0	40

40-43: UNFAVORABLE EVALUATION RESULTS
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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
DORMAC	TEST OF SYNATIC ABILITIES	0.0	40
EDUCATIONAL ACTIVITIES	DRAGON GAMES	1982.0	40
EDUCATIONAL ACTIVITIES	ENGLISH BASICS CONCEPTS IN LANGUAGE ARTS	0.0	40
EDUCATIONAL ACTIVITIES	ENGLISH BASICS PARTS OF SPEECH	0.0	40
EDUCATIONAL ACTIVITIES	FLASH SPELLING	0.0	40
EDUCATIONAL ACTIVITIES	LITERATURE - HOW TO READ IN THE CONTENT AREAS	0.0	40
EDUCATIONAL ACTIVITIES	MATH - HOW TO READ IN THE CONTENT AREAS	0.0	40
EDUCATIONAL ACTIVITIES	OUR WEIRD & WACKY WORLD	1981.0	41
EDUCATIONAL ACTIVITIES	PUNCTUATION 1	0.0	40
EDUCATIONAL ACTIVITIES	PUNCTUATION 2	0.0	40
EDUCATIONAL ACTIVITIES	QUOTATION MARKS	1982.0	40
EDUCATIONAL ACTIVITIES	SCIENCE - HOW TO READ IN THE CONTENT AREAS	0.0	40
EDUCATIONAL ACTIVITIES	SCRAMBLED LETTERS	0.0	40
EDUCATIONAL ACTIVITIES	SOCIAL STUDIES - HOW TO READ IN THE CONTENT AREAS	0.0	40
EDUCATIONAL ACTIVITIES	SPELLTRONICS	0.0	40
EDUCATIONAL ACTIVITIES	WRITING COMPETENCY PROGRAM	0.0	40
EDUCATIONAL DESIGN	LANGUAGE ARTS SYSTEMS	0.0	60
EDUCULTURE	BASIC SENTENCE PATTERNS	1982.0	40
EDUCULTURE	SENTENCE PATTERNS WITH MODIFIERS	0.0	40
EDUCULTURE	USING INDEPENDENT CLAUSES	0.0	40
EDUCULTURE	USING SUBORDINATE CLAUSES	0.0	40
EDUCULTURE	USING SUBORDINATE PHRASES	0.0	40
EDUSOFT	ALPHABET SONG	0.0	60
EDUTEK CORPORATION	BASIC READING SKILLS	0.0	60
EDUTEK CORPORATION	CRAZY SENTENCES	0.0	60
EDUTEK CORPORATION	GAME OF HARD/SOFT CONSONANTS	0.0	60
EDUTEK CORPORATION	GAME OF SYNONYMS & ANTONYMS	0.0	60
EDUTEK CORPORATION	MAIN IDEA	0.0	40
EDUTEK CORPORATION	SHORT VOWELL BOX	0.0	60
EDUTEK CORPORATION	SYLLABICATION	0.0	60
EDUTEK CORPORATION	SYLLABICATION TUTORIAL	0.0	60
EDUTEK CORPORATION	SYLLABLE COUNT	0.0	60
EDUTEK CORPORATION	TRUE OR FALSE SYLLABICATIONS	0.0	60
EDUTEK CORPORATION	VOCABULARY QUIZ	0.0	60
EDUTEK CORPORATION	VOWELL EXERCISE	0.0	40
EDUTEK CORPORATION	WHAT WAS THAT WORD	0.0	40
EDUTEK CORPORATION	WORD BREAK UP	0.0	60
ENCYCLOPAEDIA BRITANNICA	ADJECTIVES	0.0	40
ENCYCLOPAEDIA BRITANNICA	ADVERBS	0.0	40
ENCYCLOPAEDIA BRITANNICA	BASIC ENGLISH SKILLS	1983.0	40
ENCYCLOPAEDIA BRITANNICA	COMPUTER ANIMATED READING INSTRUCTION SYSTEM	0.0	40
ENCYCLOPAEDIA BRITANNICA	GRAMMAR & WRITING	0.0	40
ENCYCLOPAEDIA BRITANNICA	NOUNS	0.0	40
ENCYCLOPAEDIA BRITANNICA	PARAGRAPHS	0.0	40
ENCYCLOPAEDIA BRITANNICA	PARTS OF SPEECH	0.0	40
ENCYCLOPAEDIA BRITANNICA	PREPOSITIONS/CONJUNCTIONS	0.0	40
ENCYCLOPAEDIA BRITANNICA	PRONOUNS	0.0	40
ENCYCLOPAEDIA BRITANNICA	SENTENCE PATTERNS	0.0	40
ENCYCLOPAEDIA BRITANNICA	USAGE	0.0	40
ENCYCLOPAEDIA BRITANNICA	VERBS	0.0	40

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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
FULLMER & ASSOCIATES	ALPHABETIZE	0.0	40
FUNK VOCABWARE	POWER OF WORDS	0.0	60
GEORGE EARL PUBLISHING	READINGS IN LITERATURE	0.0	40
HARTLEY COURSEWARE	ADJECTIVES	0.0	60
HARTLEY COURSEWARE	ADVERBS	0.0	60
HARTLEY COURSEWARE	ANALOGIES ADVANCED	0.0	60
HARTLEY COURSEWARE	ANALOGIES TUTORIAL	0.0	60
HARTLEY COURSEWARE	ANTONYMS SYNONYMS	1982.0	40
HARTLEY COURSEWARE	CAPITALIZATION	0.0	60
HARTLEY COURSEWARE	CONSONANTS	1984.0	41
HARTLEY COURSEWARE	FACT & OPINION	0.0	60
HARTLEY COURSEWARE	FIGURATIVE LANGUAGE	0.0	60
HARTLEY COURSEWARE	HOMONYMS	1982.0	40
HARTLEY COURSEWARE	MULTIPLE SKILLS	0.0	60
HARTLEY COURSEWARE	NOUNS PRONOUNS	1982.0	40
HARTLEY COURSEWARE	ROOTS/AFFIXES	1984.0	42
HARTLEY COURSEWARE	VERB USAGE 1	0.0	60
HARTLEY COURSEWARE	VERB USAGE 2	0.0	60
HARTLEY COURSEWARE	VERB USAGE 3	0.0	60
HARTLEY COURSEWARE	VERBS	0.0	60
HARTLEY COURSEWARE	VOCABULARY CONTROLLED	0.0	60
HARTLEY COURSEWARE	VOCABULARY DOLCH	0.0	60
HARTLEY COURSEWARE	VOCABULARY ELEMENTARY	0.0	60
HARTLEY COURSEWARE	VOWELS	1984.0	41
HARTLEY COURSEWARE	VOWELS TUTORIAL	0.0	60
HARTLEY COURSEWARE	WHO,WHAT,WHERE,WHEN,WHY	0.0	60
HARTLEY COURSEWARE	WORD FAMILIES	1981.0	40
HARTLEY COURSEWARE	WORD-A-TACH	0.0	60
IDEATEACH	WORD DEMON	0.0	40
IDEATECH	QUESTIONS & STORY	0.0	60
INFORMATICS SOFTWARE	CONTROLLED READING PLUS	0.0	60
INFORMATICS SOFTWARE	ENGLISH COMPOSITIONS	0.0	60
INFORMATICS SOFTWARE	ENGLISH SPELLING	0.0	60
INFORMATICS SOFTWARE	FLEXIBLE SPELLING	0.0	60
INFORMATICS SOFTWARE	IMAGERY	0.0	60
INFORMATICS SOFTWARE	MAGIC FOREST	0.0	60
INFORMATICS SOFTWARE	REM LANGUAGE	0.0	60
INFORMATICS SOFTWARE	SENTENCE SCRAMBLE	0.0	60
INFORMATICS SOFTWARE	SEQUENCING	0.0	60
INFORMATICS SOFTWARE	SHADE	0.0	60
INFORMATICS SOFTWARE	SPELL IT	0.0	60
INSTANT SOFTWARE	CAPITALIZATION	0.0	40
INTELLECTUAL SOFTWARE	ADJECTIVES: ADDING NEW IDEAS TO NOUNS & PRONOUNS	1983.0	41
INTELLECTUAL SOFTWARE	ADVENTURES IN SPACE	1983.0	41
INTELLECTUAL SOFTWARE	ADVERBIAL CLAUSES	0.0	40
INTELLECTUAL SOFTWARE	ADVERBS: MODIFIERS OF VERBS, ADJECTIVES & ADVERBS	0.0	40
INTELLECTUAL SOFTWARE	AGREEABLE VERBS	0.0	40
INTELLECTUAL SOFTWARE	AGREEMENT OF PRONOUN WITH ANTECEDENT	0.0	40
INTELLECTUAL SOFTWARE	AGREEMENT OF SUBJECT & VERB	0.0	40
INTELLECTUAL SOFTWARE	ALPHABET HARVEY	1984.0	41

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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
INTELLECTUAL SOFTWARE	BEGINNER READER	0.0	40
INTELLECTUAL SOFTWARE	CAPITALIZATION & MORE PUNCTUATION	0.0	40
INTELLECTUAL SOFTWARE	CASE & GENDER OF NOUNS & PRONOUNS	0.0	40
INTELLECTUAL SOFTWARE	CASE OF NOUNS & PRONOUNS	0.0	40
INTELLECTUAL SOFTWARE	CLAUSES & WHOLE SENTENCES	0.0	40
INTELLECTUAL SOFTWARE	COMPARING GERUND, PARTICIPIAL & INFINITIVE PHRASES	0.0	40
INTELLECTUAL SOFTWARE	COMPLEMENTS OF VERBS	0.0	40
INTELLECTUAL SOFTWARE	COMPREHENSIVE GRAMMAR REVIEW	0.0	40
INTELLECTUAL SOFTWARE	CONFUSING VERBS	0.0	40
INTELLECTUAL SOFTWARE	EIGHT PARTS OF SPEECH	0.0	40
INTELLECTUAL SOFTWARE	FABLES & POEMS	0.0	40
INTELLECTUAL SOFTWARE	FIFTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	FOURTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	GERUNDS	0.0	40
INTELLECTUAL SOFTWARE	INFINITIVES	0.0	40
INTELLECTUAL SOFTWARE	LEARNING PARTS OF SPEECH	0.0	40
INTELLECTUAL SOFTWARE	MANAGING THE SENTENCE	0.0	40
INTELLECTUAL SOFTWARE	MODIFIERS: ADJECTIVES	0.0	40
INTELLECTUAL SOFTWARE	MODIFIERS: ADVERBS	0.0	40
INTELLECTUAL SOFTWARE	MYTHS	0.0	40
INTELLECTUAL SOFTWARE	NOUN CLAUSES	0.0	40
INTELLECTUAL SOFTWARE	NOUNS	0.0	40
INTELLECTUAL SOFTWARE	NOUNS: WORDS USED AS NAMES	0.0	40
INTELLECTUAL SOFTWARE	PACKAGE 1 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	PACKAGE 2 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	PART 1 EIGHTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	PART 1 PRACTICAL GRAMMAR	0.0	40
INTELLECTUAL SOFTWARE	PART 2 COMPREHENSIVE REVIEW	0.0	40
INTELLECTUAL SOFTWARE	PART 2 EIGHTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	PARTICIPLES	0.0	40
INTELLECTUAL SOFTWARE	PARTS OF SPEECH 1	0.0	40
INTELLECTUAL SOFTWARE	PARTS OF SPEECH 2	0.0	40
INTELLECTUAL SOFTWARE	PATTERNS OF SENTENCES	0.0	40
INTELLECTUAL SOFTWARE	PRACTICAL GRAMMAR 2	0.0	40
INTELLECTUAL SOFTWARE	PRACTICAL GRAMMAR 3	0.0	40
INTELLECTUAL SOFTWARE	PREPOSITIONAL PHRASES	0.0	40
INTELLECTUAL SOFTWARE	PREPOSITIONS: WORDS THAT SHOW A RELATIONSHIP	0.0	40
INTELLECTUAL SOFTWARE	PRINCIPAL PARTS OF VERBS	1983.0	41
INTELLECTUAL SOFTWARE	PROBLEMS IN THE USE OF INFINITIVES	0.0	40
INTELLECTUAL SOFTWARE	PRONOUN AGREEMENT	0.0	40
INTELLECTUAL SOFTWARE	PRONOUNS	0.0	40
INTELLECTUAL SOFTWARE	PRONOUNS: SUBSTITUTES FOR NOUNS	0.0	40
INTELLECTUAL SOFTWARE	PUNCTUATION	0.0	40
INTELLECTUAL SOFTWARE	PUNCTUATION REVIEW	0.0	40
INTELLECTUAL SOFTWARE	READING & THINKING 1	1983.0	41
INTELLECTUAL SOFTWARE	READING & THINKING 2	0.0	40
INTELLECTUAL SOFTWARE	READING ADVENTURE 1	1984.0	41
INTELLECTUAL SOFTWARE	READING ADVENTURE 2	0.0	40
INTELLECTUAL SOFTWARE	READING ADVENTURE 3 COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	SENTENCE PATTERNS	0.0	40

40-43: UNFAVORABLE EVALUATION RESULTS	60: UNABLE TO OBTAIN AN EVALUATION COPY
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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
INTELLECTUAL SOFTWARE	SENTENCES	0.0	40
INTELLECTUAL SOFTWARE	SEVENTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	SIXTH GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	THE COMPLEX SENTENCE - ADJECTIVE CLAUSES	0.0	40
INTELLECTUAL SOFTWARE	THE COMPOUND SENTENCE	0.0	40
INTELLECTUAL SOFTWARE	THE TENSES OF VERBS	0.0	40
INTELLECTUAL SOFTWARE	THIRD GRADE READING COMPREHENSION	0.0	40
INTELLECTUAL SOFTWARE	VERB VOICE, TENSE & MOOD	0.0	40
INTELLECTUAL SOFTWARE	VERBS: ACTION & LINKING WORDS	0.0	40
INTELLECTUAL SOFTWARE	VERBS: VOICE & MOOD	0.0	40
INTELLECTUAL SOFTWARE	VOCAB. ADVENTURE 1	1984.0	41
INTELLECTUAL SOFTWARE	VOL. 1 PRACTICAL COMPOSITION	1983.0	41
INTELLECTUAL SOFTWARE	VOL. 2 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	VOL. 3 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	VOL. 4 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	VOL. 5 PRACTICAL COMPOSITION	0.0	40
INTELLECTUAL SOFTWARE	WORKING WITH SENTENCES	0.0	40
ISLAND SOFTWARE	WORD FACTORY	1982.0	40
JOSTENS LEARNING SYSTEMS	MICROSYSTEM 80 CRITICAL READING	1980.0	40
KEY PORTER SOFTWARE	MY LIFE AS A VIDEO GAME	1984.0	41
KEY PORTER SOFTWARE	THE FOUR MAGICS OF MANDALAY	1984.0	41
KEY PORTER SOFTWARE	THE MYSTERY ON HALO ISLAND	1984.0	41
LEARNING LINE	LOOK 'N HOOK	0.0	40
LEARNING WELL	AROUND THE WORLD/GETTING THE MAIN IDEA	1982.0	40
LEARNING WELL	BEHIND THE WHEEL/FOLLOWING DIRECTIONS	1982.0	40
LEARNING WELL	CHIEF OF DETECTIVES/DRAWING CONCLUSIONS	0.0	40
LEARNING WELL	HIDDEN TREASURE/CONTEXT CLUES	0.0	40
LEARNING WELL	MOUNTAIN CLIMBING/CAUSE & EFFECT	0.0	40
LEARNING WELL	RACETRACK/READING FOR DETAIL	0.0	40
LEARNING WELL	SCHOOL DAYS/INFERENCE	0.0	40
LEARNING WELL	SCRAMBLED WORDS/ALPHABETIZING	1982.0	40
LEARNING WELL	WHAT COMES FIRST/SEQUENCE	0.0	40
LITTLE, BROWN & COMPANY	GRAMMARLAB	0.0	60
MEDIA BASICS COURSEWARE	RETURN TO READING: THE RED PONY	1983.0	40
MENTOR SOFTWARE	SPELLING DRILL 1	0.0	40
MENTOR SOFTWARE	SPELLING DRILL 2	0.0	40
MICRO ED	PUNCTUATION SERIES	1982.0	41
MICRO ED	SPELLING LEVEL A	1982.0	41
MICRO ED	SPELLING LEVEL B	1982.0	41
MICRO ED	SPELLING LEVEL C	1982.0	41
MICRO ED	SPELLING LEVEL D	1982.0	41
MICRO ED	SPELLING LEVEL E	1982.0	41
MICRO ED	USAGE BONERS	1982.0	41
MICRO ED	VOCABULARY	0.0	40
MICRO LEARNINGWARE	ADJECTIVE RECOGNITION	0.0	40
MICRO LEARNINGWARE	ELEM. PACKAGE 3	0.0	60
MICRO LEARNINGWARE	GRAMMAR PACKAGE 1	0.0	40
MICRO LEARNINGWARE	GRAMMAR PACKAGE 2	0.0	60
MICRO LEARNINGWARE	PERSON PLACE OR THING	0.0	40
MICRO LEARNINGWARE	SPELLING	0.0	60

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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
MICRO LEARNINGWARE	VOCABULARY BUILDER	0.0	60
MICRO LEARNINGWARE	WORD SCRAMBLE	0.0	60
MICRO POWER & LIGHT	SENTENCES	1982.0	40
MICRO POWER & LIGHT	SPELLING RULES	0.0	40
MICROCOMPUTER WORKSHOPS	CAPITALIZATION PLUS	1983.0	41
MICROCOMPUTER WORKSHOPS	FLASH SPELL HELICOPTER	1983.0	41
MICROCOMPUTERS IN EDUCATION	ADJECTIVES	1981.0	41
MICROCOMPUTERS IN EDUCATION	ALPHABET	1981.0	41
MICROCOMPUTERS IN EDUCATION	NOUNS	1981.0	41
MICROCOMPUTERS IN EDUCATION	PLURALS	1981.0	41
MICROCOMPUTERS IN EDUCATION	VERBS	1981.0	41
MICROMEDIA SOFTWARE	WATCHWORD	0.0	40
MILLIKEN PUBLISHING	CLOZE PLUS LEVEL G	1983.0	42
MILLIKEN PUBLISHING	CLOZE PLUS LEVEL H	1983.0	42
MILLIKEN PUBLISHING	LEVEL A COMPREHENSION POWER	1981.0	42
MILLIKEN PUBLISHING	LEVEL B COMPREHENSION POWER	1981.0	42
MILLIKEN PUBLISHING	LEVEL C COMPREHENSION POWER	1981.0	42
MILLIKEN PUBLISHING	SNAKE O NYMS/WORD FLIP	1983.0	41
MINNESOTA EDUCATIONAL SOFTWARE	FLYING HIGH	1984.0	41
NTS	WATCH YOUR LANGUAGE	0.0	40
NTS	WORDS ARE FUN SET 1	0.0	40
NTS	WORDS ARE FUN SET 2	0.0	40
ORANGE CHERRY MEDIA	ACTIVE READER WORLD OF NATURE SERIES	0.0	60
ORANGE CHERRY MEDIA	ADVENTURES AROUND THE WORLD	1982.0	40
ORANGE CHERRY MEDIA	BASIC LANGUAGE SKILLS	0.0	40
ORANGE CHERRY MEDIA	CLOZE TECHNIQUE FOR DEVELOPING COMPREHENSION	0.0	60
ORANGE CHERRY MEDIA	SPELLING	1982.0	40
ORANGE CHERRY MEDIA	STRANGE ENCOUNTERS YOU DECIDE	1982.0	40
ORANGE CHERRY MEDIA	VOCABULARY BUILDERS	0.0	60
ORANGE CHERRY MEDIA	WORD FACTORY	0.0	40
ORANGE CHERRY MEDIA	WORKING WITH THE ALPHABET	0.0	60
PEACHTREE SOFTWARE	COMPU-SPELL	0.0	40
PEACHTREE SOFTWARE (EDUWARE)	COMPUREAD	0.0	40
PEACHTREE SOFTWARE (EDUWARE)	SPELLING BEE GAMES	0.0	50
PHOENIX SOFTWARE	BIRTH OF THE PHOENIX	0.0	60
POTOMAC MICRORESOURCES	KID BITS WORD FAIR	0.0	60
PROGRAM DESIGN	ALPHABET ARCADE	0.0	60
PROGRAM DESIGN	ANALOGIES	0.0	60
PROGRAM DESIGN	CHALLENGE	0.0	60
PROGRAM DESIGN	DO IT YOURSELF SPELLING	0.0	60
PROGRAM DESIGN	LET'S SPELL	0.0	60
PROGRAM DESIGN	READ'N SPELL	0.0	60
PROGRAM DESIGN	READING COMPREHENSION WHAT'S DIFFERENT	0.0	60
PROGRAM DESIGN	SPELLING BUILDER	0.0	40
PROGRAM DESIGN	STORY BUILDER WORD MASTER	1981.0	40
PROGRAM DESIGN	VOCABULARY BUILDER 1	0.0	60
PROGRAM DESIGN	VOCABULARY BUILDER 2	0.0	60
RANDOM HOUSE	ALPHABET KEYBOARD	1982.0	40
RANDOM HOUSE	ALPHABET, SEQUENCING & ALPHABETIZING	1982.0	41
RANDOM HOUSE	CUSTOMIZED ALPHABET DRILL	1981.0	41

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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
RANDOM HOUSE	CUSTOMIZED FLASH SPELLING	1983.0	41
RANDOM HOUSE	FUNDAMENTAL PHONICS & WORD ATTACK	1982.0	40
RANDOM HOUSE	FUNDAMENTAL PUNCTUATION PRACTICE	1982.0	41
RANDOM HOUSE	HOMONYMS IN CONTEXT	1983.0	41
RANDOM HOUSE	SPELLING DEMONS COMPUTER SPELL DOWN	1982.0	42
RANDOM HOUSE	WORD BLASTER	1982.0	41
READER'S DIGEST SERVICES	CHAMBERS OF VOCAB	1983.0	40
READER'S DIGEST SERVICES	KEY LINGO	0.0	40
RIVER BEND SOFTWARE	COMPARISONS WITH ADJECTIVES	1983.0	41
RIVER BEND SOFTWARE	ENGLISH USAGE SERIES	1983.0	41
RIVER BEND SOFTWARE	PASSIVE VOICE	1983.0	41
RIVER BEND SOFTWARE	PERSONAL PRONOUNS	1983.0	41
RIVER BEND SOFTWARE	PLURALS & POSSESSIVES OF NOUNS	1983.0	41
RIVER BEND SOFTWARE	SUBJECT/VERB AGREEMENT	1983.0	41
SCHOLASTIC	FACT & FICTION TOOL KIT	0.0	50
SCHOLASTIC	STORY TREE	1984.0	41
SCHOOLHOUSE SOFTWARE	CANNON	0.0	40
SCHOOLHOUSE SOFTWARE	CASTLE BUILDER	0.0	40
SCHOOLHOUSE SOFTWARE	COWBOY	0.0	40
SCHOOLHOUSE SOFTWARE	CREEPY CRAWLIES	0.0	40
SCHOOLHOUSE SOFTWARE	MONSTER KIT	0.0	40
SCHOOLHOUSE SOFTWARE	PET BUG	0.0	40
SCHOOLHOUSE SOFTWARE	ROCKET LAUNCH	0.0	40
SCHOOLHOUSE SOFTWARE	SAFE LANDING	0.0	40
SCHOOLHOUSE SOFTWARE	STORM	0.0	40
SCHOOLHOUSE SOFTWARE	SUB CHASE	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (APOSTROPHE)	0.0	40
SCIENCE RESEARCH ASSOCIATES	CONCENTRATION CROSSWORDS	1982.0	42
SCIENCE RESEARCH ASSOCIATES	HOW TO PREPARE FOR AND TAKE TESTS	1983.0	41
SCIENCE RESEARCH ASSOCIATES	SENTENCE STRUCTURE:	1983.0	41
SCIENCE RESEARCH ASSOCIATES	SPELLING MAGICIAN 1	1983.0	41
SCIENCE RESEARCH ASSOCIATES	SPELLING MAGICIAN 2	1983.0	41
SCIENCE RESEARCH ASSOCIATES	SPELLING MAGICIAN 3	1983.0	41
SCIENCE RESEARCH ASSOCIATES	SPELLING MAGICIAN 4	1983.0	41
SCIENCE RESEARCH ASSOCIATES	VOL. 1 WORDSKILL FOR THE MICROCOMPUTER	1982.0	40
SCIENCE RESEARCH ASSOCIATES	VOL. 2 WORDSKILL FOR THE MICROCOMPUTER	1982.0	40
SCIENCE RESEARCH ASSOCIATES	VOL. 3 WORDSKILL FOR THE MICROCOMPUTER	1982.0	40
SCIENCE RESEARCH ASSOCIATES	VOL. 4 WORDSKILL FOR THE MICROCOMPUTER	1982.0	41
SCIENCE RESEARCH ASSOCIATES	VOL. 5 WORDSKILL FOR THE MICROCOMPUTER	1982.0	40
SCIENCE RESEARCH ASSOCIATES	VOL. 6 WORDSKILL FOR THE MICROCOMPUTER	1982.0	40
SCOTT FORESMAN	ABOUT US	1983.0	41
SCOTT FORESMAN	ACROBAT	1984.0	41
SCOTT FORESMAN	ANIMALS & INSECTS	1983.0	41
SCOTT FORESMAN	CLOTHES	1983.0	41
SCOTT FORESMAN	COLORS AND NUMBERS	1983.0	41
SCOTT FORESMAN	DUELLING CATAPULTS	1984.0	41
SCOTT FORESMAN	FOOD	1983.0	41
SCOTT FORESMAN	FURNITURE	1983.0	41
SCOTT FORESMAN	GROUND GRABBER	1984.0	41
SCOTT FORESMAN	INSIDE	1983.0	41

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LANGUAGE ARTS TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
SCOTT FORESMAN	OUTSIDE	1983.0	41
SCOTT FORESMAN	SECRET LANGUAGE	1984.0	41
SCOTT FORESMAN	SNAP JUDGEMENT	1985.0	41
SCOTT FORESMAN	THINGS WE LIKE TO DO	1983.0	41
SCOTT FORESMAN	TOYS	1983.0	41
SCOTT FORESMAN	TRANSPORTATION	1983.0	41
SCOTT FORESMAN	WHAT ARE THEY DOING	1983.0	41
SCOTT FORSEMAN	GRAMMARQUEST SERIES	0.0	41
SCOTT FORSEMAN	GRAMMAZE	0.0	40
SOUTHWEST EDPSYCH SERVICES	SPELLING SORCERY	0.0	60
SOUTHWEST EDPSYCH SERVICES	THE READING MACHINE	0.0	60
SOUTHWEST EDPSYCH SERVICES	THE SPELLING MACHINE	0.0	60
SPINNAKER SOFTWARE	RHYMES & RIDDLES	0.0	40
SPINNAKER SOFTWARE	STORY MACHINE	0.0	40
SUBLOGIC COMMUNICATIONS	WHOLE BRAIN SPELLING	0.0	60
SUNBURST COMMUNICATIONS	BRIDGE TO TERABITHIA	0.0	40
SUNBURST COMMUNICATIONS	CALL IT COURAGE	0.0	40
SUNBURST COMMUNICATIONS	CRICKET IN TIMES SQUARE	0.0	40
SUNBURST COMMUNICATIONS	DARK IS RISING	0.0	40
SUNBURST COMMUNICATIONS	GREAT GILLY HOPKINS	0.0	40
SUNBURST COMMUNICATIONS	ISLAND OF THE BLUE DOLPHINS	0.0	40
SUNBURST COMMUNICATIONS	KING OF THE WIND	0.0	40
SUNBURST COMMUNICATIONS	MRS FRISBY & THE RATS OF NIMH	0.0	40
SUNBURST COMMUNICATIONS	MY SIDE OF THE MOUNTAIN	0.0	40
SUNBURST COMMUNICATIONS	SLAVE DANCER	0.0	40
SUNBURST COMMUNICATIONS	SOUNDER	0.0	40
SUNBURST COMMUNICATIONS	SUMMER OF SWANS	0.0	40
SUNBURST COMMUNICATIONS	WESTING GAME	0.0	40
SUNBURST COMMUNICATIONS	WITCH OF BLACKBIRD POND	0.0	40
SUNBURST COMMUNICATIONS	WRINKLE IN TIME	0.0	40
SVE	TEACH ME WORDS	0.0	40
T.H.E.S.I.S.	FISHING FOR HOMONYMS	0.0	40
TELEPHONE SOFTWARE CONNECTION	SPELLING TUTOR	0.0	60
THE LEARNING SEED	101 MISUSED WORDS	1983.0	41
THE LEARNING SEED	ENGLISH CHALLENGE	1984.0	41
THE LEARNING SEED	THE SPELLING MACHINE	1985.0	41
TIES	ELECTRIC ENGLISH LESSONS	0.0	40
TIES	PHONET	0.0	40
UNICORN TREASURES	FUNBUNCH COLLEGE PREP	0.0	60
UNICORN TREASURES	FUNBUNCH ELEMENTARY	0.0	60
UNICORN TREASURES	FUNBUNCH INTERMEDIATE	0.0	60
UNIVERSAL SYSTEMS FOR EDUCATION	GRADE 2 PAL READING PACKAGE	0.0	40
UNIVERSAL SYSTEMS FOR EDUCATION	GRADE 3 PAL READING PACKAGE	0.0	40
UNIVERSAL SYSTEMS FOR EDUCATION	GRADE 4 PAL READING PACKAGE	0.0	40
UNIVERSAL SYSTEMS FOR EDUCATION	GRADE 5 PAL READING PACKAGE	0.0	40
UNIVERSAL SYSTEMS FOR EDUCATION	GRADE 6 PAL READING PACKAGE	0.0	40
VOTEX CORPORATION	MACBETH: A REVIEW	1984.0	41
WISE OWL WORKSHOPS	JABBERWOCKY	0.0	40

40-43: UNFAVORABLE EVALUATION RESULTS
50: PRODUCT HAS BEEN DISCONTINUED
60: UNABLE TO OBTAIN AN EVALUATION COPY
70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

LIBRARY SKILLS INDEX

AUTHORIZED

As of April 30, 1985, no Library Skills packages had been authorized.

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

LibSk 3

LIBRARY SKILLS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
CALICO	ALMANACS	1982.0	42
CALICO	BARTLETT'S FAMILIAR QUOTATIONS	1982.0	43
CALICO	CURRENT BIOGRAPHY	1982.0	42
CALICO	ESSAY & GENERAL LITERATURE	0.0	50
CALICO	LIBRARY CATALOG	1983.0	42
CALICO	PERIODICAL INDEXES	1982.0	42
CALICO	POETRY INDEXES	1982.0	42
CEEDE	PART 1 DIG OUT THE FACTS UNIT II	0.0	60
CEEDE	PART 2 DIG OUT THE FACTS UNIT II	0.0	60
CEEDE	PART 3 DIG OUT THE FACTS UNIT II	0.0	60
COMBASE	ORGANIZATION OF RESOURCES	1983.0	42
COMBASE	RESEARCH & STUDY SKILLS	1983.0	42
ENCYCLOPAEDIA BRITANNICA	LIBRARY SKILLS	1984.0	42
INTELLECTUAL SOFTWARE	DICTIONARY SKILLS	1983.0	41
INTELLECTUAL SOFTWARE	HOW TO DO RESEARCH	1983.0	41
LEARNCO	ANSWERING QUESTIONS LIBRARY STYLE	1982.0	42
MCNEIL ASSOCIATES	CARD CATALOG	0.0	60
MCNEIL ASSOCIATES	DEWEY DECIMAL SYSTEM	0.0	60
MCNEIL ASSOCIATES	FAMOUS FIRST FACTS	0.0	60
MCNEIL ASSOCIATES	GENERAL LIBRARY TERMS	0.0	60
MCNEIL ASSOCIATES	READER'S GUIDE TO PERIODICAL LITERATURE	0.0	60
MICRO POWER & LIGHT	LIBRARY SKILLS	0.0	40
MICROCOMPUTERS IN EDUCATION	BOOKSHELF	1981.0	41
RIGHT ON PROGRAMS	BIOGRAPHIES	1983.0	41
RIGHT ON PROGRAMS	CARD CATALOG	1983.0	42
RIGHT ON PROGRAMS	CATALOG CARDS	1983.0	41
RIGHT ON PROGRAMS	COPYRIGHT NOTICE	1983.0	41
RIGHT ON PROGRAMS	DEWEY DECIMAL SYSTEM	1983.0	41
RIGHT ON PROGRAMS	DICTIONARY SKILLS	1983.0	41
RIGHT ON PROGRAMS	FICTION SKILLS	1983.0	41
RIGHT ON PROGRAMS	INDEX	1983.0	41
RIGHT ON PROGRAMS	LOCATING BOOKS	1983.0	41
RIGHT ON PROGRAMS	REFERENCE TABLES IN AN ALMANAC	1983.0	41
RIGHT ON PROGRAMS	TABLE OF CONTENTS	1983.0	41
RIGHT ON PROGRAMS	TITLE PAGE	1983.0	41
SCHOOL & HOME COURSEWARE	LIBRARY SKILLS	0.0	60

40-43: UNFAVORABLE EVALUATION RESULTS
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70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

MATHEMATICS INDEX

AUTHORIZED

TITLE	PUBLISHER	GRADES	STATUS	PAGE
Alien Addition	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Alligator Mix	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Basic Math Techniques	Merlan Scientific	7 - 12	Supplementary	Ma 7
Bumble Games	The Learning Company (Addison Wes.)	K - 4	Supplementary	Ma 9
Bumble Plot	The Learning Company (Addison Wes.)	2 - 7	Supplementary	Ma 11
Computer Graphing Experiments Vol. 1	Addison Wesley	10 - 12	Recommended	Ma 13
Computer Graphing Experiments Vol. 2	Addison Wesley	10 - 12	Recommended	Ma 13
Computer Graphing Experiments Vol. 3	Addison Wesley	10 - 12	Recommended	Ma 13
Count and Add	Edusoft	K - 3	Supplementary	Ma 15
Demolition Division	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Dragon Mix	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Elementary Math Drill	ECR Educational Consultants	3 - 5	Supplementary	Ma 17
Equations	Microcomputer Workshops	7 - 11	Supplementary	Ma 19
Explorer Metros	Sunburst Communications	4 - 9	Supplementary	Ma 21
Exponential Notation	Merlan Scientific	7 - 12	Supplementary	Ma 23
Fractions/Decimals	Swift Publishing Company	7 - 9	Supplementary	Ma 25
Gertrude's Puzzles	The Learning Company (Addison Wes.)	1 +	Supplementary	Ma 27
Gertrude's Secrets	The Learning Company (Addison Wes.)	K - 4	Supplementary	Ma 29
Laser Chaser	Indian Head Software	7 - 9	Supplementary	Ma 31
Math Activities 5	Houghton Mifflin	5	Recommended	Ma 33
Math Activities 6	Houghton Miffllin	6	Recommended	Ma 35
Mathematics: Level A	Science Research Associates	1 - 2	Recommended	Ma 37
Mathematics: Level B	Science Research Associates	3 - 4	Recommended	Ma 37
Mathematics: Level C	Science Research Associates	5 - 6	Recommended	Ma 37

AUTHORIZED - continued

Math Sequences	Milliken Publishing Company	1 - 8	Recommended	Ma 39
Measurement	Merlan Scientific	7 - 12	Supplementary	Ma 41
Meteor Multiplication	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Minus Mission	Developmental Learning Materials	1 - 6	Supplementary	Ma 5
Miscellaneous	Merlan Scientific	7 - 12	Supplementary	Ma 43
Multiplying Fractions	Microcomputer Workshops	5 - 8	Supplementary	Ma 45
Solving Quadratic Equations	Microcomputer Workshops	9 - 12	Supplementary	Ma 47
Whole Numbers	Swift Publishing Company	1 - 9	Supplementary	Ma 49

UNDER THIRD STAGE REVIEW

Algebra Drill & Practice I	Conduit	9 +	Still Under Review	Ma 51
Basic Number Facts	Control Data Publishing	1 - 6	Still Under Review	Ma 53
Binomial Multiplication	Microcomputer Workshops	8 - 11	Still Under Review	Ma 55
Code Quest	Sunburst Communications	4 - 7	Still Under Review	Ma 57
Counters	Sunburst Communications	K - 1	Still Under Review	Ma 59
Equations II	Microcomputer Workshops	6 - 11	Still Under Review	Ma 61
Factoring Algebraic Expressions	Microcomputer Workshops	9 - 12	Still Under Review	Ma 63
Fast Facts	Edusoft	1 - 6	Still Under Review	Ma 65
Fay: That Math Woman	Didatech Software	1 - 6	Still Under Review	Ma 67
Fraction Factory	Springboard Software	3 - 6	Still Under Review	Ma 69
Geometric Concepts: Area	Jostens Learning Systems	6 - 9	Still Under Review	Ma 71
Geometric Concepts: Perimeter	Jostens Learning Systems	6 - 9	Still Under Review	Ma 73
Graphing Equations	Conduit	10+	Still Under Review	Ma 75

UNDER THIRD STAGE REVIEW - continued

TITLE	PUBLISHER	GRADES	STATUS	PAGE
Graphing Linear Functions	Microcomputer Workshops	9 - 10	Still Under Review	Ma 77
Integers/Integers Fast Facts	Edusoft	4 - 9	Still Under Review	Ma 79
Learning About Numbers	C & C Software	K - 4	Still Under Review	Ma 81
Math Activities Courseware 3	Houghton Mifflin	3	Still Under Review	Ma 83
Math Activities Courseware 4	Houghton Mifflin	4	Still Under Review	Ma 87
Math Activities Courseware 7	Houghton Mifflin	7	Still Under Review	Ma 91
Math Activities Courseware 8	Houghton Mifflin	8	Still Under Review	Ma 95
Mathematics: Level D	Science Research Associates	7 - 9	Still Under Review	Ma 97
Math Strategies: Problem Solving	Science Research Associates	6+	Still Under Review	Ma 101
Moptown Hotel	The Learning Company (Addison Wes.)	3 +	Still Under Review	Ma 105
Moptown Parade	The Learning Company (Addison Wes.)	1 - 4	Still Under Review	Ma 107
Motion Geometry	Ginn and Company	7 - 8	Still Under Review	Ma 109
Percents	Media Materials	6 - 8	Still Under Review	Ma 111
Piece of Cake	Springboard Software	2 - 9	Still Under Review	Ma 113
Problem Solving In Algebra	Encyclopaedia Britannica	10 - 12	Still Under Review	Ma 115
Ratios and Proportions	Media Materials	6 - 8	Still Under Review	Ma 117
Simultaneous Linear Equations	Microcomputer Workshops	9 - 12	Still Under Review	Ma 119
Stickybear Numbers	Weekly Reader Family Software	K - 1	Still Under Review	Ma 121
Stickybear Shapes	Weekly Reader Family Software	K - 1	Still Under Review	Ma 123
The Factory	Sunburst Communications	4 - 9	Still Under Review	Ma 125
The King's Rule	Sunburst Communications	4+	Still Under Review	Ma 127
The Whatsit Corporation	Sunburst Communications	6+	Still Under Review	Ma 129

LIST OF TITLES WE ARE UNABLE TO RECOMMEND Ma 131

ALIEN ADDITION
MINUS MISSION
METEOR MULTIPLICATION
DEMOLITION DIVISION
ALLIGATOR MIX
DRAGON MIX

DESCRIPTION

Titles: Alien Addition, Minus Mission, Meteor Multiplication, Demolition Division, Alligator Mix, Dragon Mix
Series: Arcademic Skill Builders in Mathematics
Authors: Jerry Chaffin & Bill Maxwell
Publisher: Developmental Learning Materials
Source: P. O. Box 4000, One DLM Park, Allen, Texas, 75003
Subject: Mathematics
Topics: Addition, subtraction, multiplication and division of whole numbers 0-9
Components: Each title has a disk, guide (20p.), 53 flashcards, 12 blackline masters
System Requirements: Apple II+/IIe only, 48K, 1 disk drive, color monitor preferable, game paddles optional
Other Formats Available (not evaluated): IBM PC, Commodore 64, Atari 400/800/1200
Alberta Education Call No.: QA 115 C433 1982

Version: 1982
Display Language: English
Cost: $44 U.S. /disk (1984)
Tel. #: (214) 248-6300
Users : Grades 1-6

OBJECTIVES

To assist students in learning basic arithmetic facts through motivational practice. Following extensive drill, the student will correctly answer basic fact problems at a rate of 40-90 responses per minute with 100% accuracy.

PEDAGOGICAL CONTENT DESCRIPTION

Four disks provide students with drill in the indicated operation. Additionally, "Alligator Mix" gives practice in addition and subtraction and "Dragon Mix" has practice in multiplication and division. All content is presented in an arcade game format where problems appear and the user manipulates the keyboard to enter or signify the correct answer.

In each disk the teacher may control the content range (digits 0-3, 0-6 or 0-9), the time limit to answer questions (1-9 seconds) and the length of the drill (1-5 minutes).

Also included are flashcards, worksheets, student record sheets, progress cards and improvement strategies.

PEDAGOGICAL CONTENT EVALUATION

Content range, sequence and depth are generally appropriate as the teacher is able to control these parameters. This allows students of varying abilities to enter and progress through the disk(s). Although any one disk may be inappropriate at a particular grade level, the series as a whole is appropriate to the target audience.

The subtraction range is somewhat limited as it does not extend into double digits.

The supplementary materials included with the disks have limited value.

As the content is presented in game format, there is no instructional component.

The arcade format does have a violent theme. Tanks are destroyed by guns, aliens are shot down by a cannon, meteors are fired at, a city is protected by fire and atomic clouds are present. Only "Alligator Mix" is non-violent.

INSTRUCTIONAL FORMAT DESCRIPTION

There are two types of interaction. In the first four games, students enter an answer and then aim and fire using one of a variety of keyboard methods. In the combined operation diskettes, the user matches an answer with a question using keyboard manipulation.

Feedback is presented both graphically and audibly. A correct answer results in the target being successfully eliminated. If an incorrect answer is entered, there is no visible result in most programs. (In "Demolition Division", the length of the cannon shot depends upon the accuracy of the answer.) If too many incorrect answers are entered, the user loses the game.

Running scores are kept and quantitative feedback is given at the end of the games. Additionally, high scores may also be shown.

INSTRUCTIONAL FORMAT EVALUATION

Success in these games is very dependent upon proficiency in manipulating keys in the correct order and this does take a measure of skill and practice. In addition, in some disks there is no easy way of erasing an error and it is faster, and thus desirable in this game format, to do nothing about the error. The game "Alligator Mix" is particularly bad in this respect. If the answer is not entered soon enough, not only does the student receive an error on that question, but the program accepts that answer for the next question, thus adding to the error total and the frustration of the user.

A number of evaluators have observed that more attention has to be paid to manual dexterity than has to be devoted to getting the answer. It is questionable whether an increase in proficiency is an increase in recall of number facts or is instead an improvement in keyboard manipulation. The fact that different methods of input are available is an advantage but this does not diminish the high emphasis that is placed on keyboard manipulation to the detriment of answer recall.

Negative feedback is poor. Through the game format, no extra assistance is given when an incorrect answer is entered. The speed necessary to run the game does not allow extra attention to be given to incorrect answers. There is no way of reviewing incorrect answers and re-presentation of such questions is not guaranteed. As a result, students may practice the facts that they already know but will not learn the facts in which they are weak.

Control of the various parameters of the program is good and adds much to the package.

The teacher must monitor the initial play of each student. As there is no pre-test, it is important that the student be placed at the appropriate speed level. The philosophy stated in the documentation that "high error rates are important in early stages" is not acceptable.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color, sound and animation are used throughout the disks. Numbers appear in standard text size and in white.

TECHNICAL CHARACTERISTICS EVALUATION

Apart from a number of minor cases, color, sound and graphics are used in a highly effective and appropriate manner. In spite of extensive graphics, the speed of the program is good. Generally speaking the technical design of the disks is a motivating factor for the students.

Problems include the operation of the alligator's mouth, determining which spaceship the dragon's mouth is pointing at, difficulty in reading scoreboards and distractions caused by sound which cannot be turned off. Instructions on the operation of the games could be included within the program.

SUMMATION

Advantages include the content sequence and depth. Students can receive practice in a particular skill and the focus on speed recall will likely have positive results for many. The programs are suitable for what they are intended to do. The material correlates with the Alberta curriculum only at the basic facts level.

The game format has serious weaknesses in helping students overcome deficiencies. There is no help and, with the entire focus being on speed, the student's attention is directed towards entering answers and not determining why an answer is wrong. Also, the programs are expensive in relation to their scope of coverage.

Some students found the games very motivating. Others soon became frustrated or disinterested.

As our evaluators were split on the value of these programs and as acceptance of the package appears to depend upon the acceptance of the game format with its inherent violence and lack of direct instructional component, teachers are stongly urged to preview before buying.

STATUS

The six disks in the "Arcademic Skill Builders in Mathematics" series have been designated as **SUPPLEMENTARY** learning resources.

PURCHASE INFORMATION

Each of the six products may be purchased for $44.00 U.S. (1984) from Developmental Learning Materials at the address given at the beginning of the report. Disks which become inoperable for any reason will be replaced without charge within a six month warranty period. There is no further warranty but replacements may be obtained for $25.00 U.S.

In Alberta, the package may be purchased from Edupro Software (see page v of the preface). Contact the company directly for price and warranty information.

These disks have the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is generally appropriate to the target audience, and reviews presented at the end of lessons provide effective capsulizations of content. Drill questions are well designed to test student understanding of the concept(s) presented in the lesson and the corrective feedback provided is excellent. Student interaction is meaningful and consistent. The addition of instructions regarding which format to use and what constitutes a format error would be helpful.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in combination upper/lower case. Color, flashing and underlining are used to highlight certain parts of the text. A graphically portrayed calculator is optionally available in the drill modes. Aural feedback is available at the start of each program segment.

TECHNICAL CHARACTERISTICS EVALUATION

Text displays are well-organized and readable and make good use of selective scrolling to keep pertinent information on the screen. Sound is appropriately user controlled. The program is bombproof and traps invalid inputs. The optional calculator function is a good idea but has very slow entry.

SUMMATION

Well-sequenced content, corrective feedback, and active student interaction make "Math Techniques" a very useful classroom instructional tool. Weaknesses of the diskette include the lack of a pre-test for all programs, lack of directions in proper formatting and some minor problems with technical design.

STATUS

"Basic Math Techniques" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $93.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire "Math for Science" series is available for $217.00. It consists of four individual packages each of which has been given a supplementary status ("Measurement", "Basic Math Techniques", "Exponential Notation" and "Miscellaneous").

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for pricing and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

BASIC MATH TECHNIQUES

DESCRIPTION

Title: Basic Math Techniques
Series: Mathematics for Science
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 27 Armstrong Ave., Georgetown, Ontario, L7G 4X6
Subjects: Mathematics, science
Topics: Determining and rounding off significant digits in addition, subtraction, multiplication and division problems
Components: 1 diskette and backup, manual (12p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Commodore PET
Alberta Education Call No.: QA 43 M174 1982

Version: 1982
Display Language: English
Cost: $93.00 (1985)
Tel. #: (416) 877-0171
Users : Junior/Senior High

OBJECTIVES

Learners will be able to:

1. Round numbers off to a given number of significant digits.
2. Show the results of adding or subtracting measured quantities using the appropriate number of digits in the answer.
3. Show the results of multiplication or division using the appropriate number of significant digits in the answer.

PEDAGOGICAL CONTENT DESCRIPTION

This diskette contains four programs, each containing two independent lesson and drill sections which are user selected from a menu:

SIGNIFICANT DIGITS - The lesson portion of this program distinguishes between measured and exact values and explains how significant digits are related to scale measurement. After presenting a number of sample problems, the user is asked to estimate the number of significant digits for eight problem types.

ROUNDING OFF - Five rules of rounding are conveyed via a series of problems (varying from simple to complex) posed for user response. Sequenced questions given after an incorrect response guide the user to formulation of the correct answer.

ADDITION/SUBTRACTION - This program poses problems in which the student must add/subtract two quantities that contain a different number of digits after the decimal. Via a step-by-step guidance procedure, the student is led to the realization that when calculations are made with numbers that express different degrees of precision, the final answer must be rounded off to indicate the appropriate degree of precision.

MULTIPLICATION/DIVISION - This program begins with an eight question pre-test checking on the student's mastery of significant digits. Depending upon the student's performance, (s)he is routed to a review of significant digits or is presented with a problem in dividing two physical values. A series of steps guides the user to answer generation and to the underlying rules for multiplication and division.

A cummulatively scored 10-question drill given at the end of each program tests student understanding of the concepts presented. (1 mark for a correct answer, 0.5 for a correct answer containing a format error, 0 for an incorrect answer).

PEDAGOGICAL CONTENT EVALUATION

This diskette effectively meets its objectives and the programs are presented in a well-sequenced manner. Content range, sequence and depth are all good. Teachers may find some confict between the systems developed in the program for determining the number of significant digits and rounding procedures and the system they may be using at present.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of choosing a lesson or drill from a menu, using the space bar for page turning and entering numerical inputs. In the last two programs the user can avail himself/herself of a graphic calculator which (s)he can clear, turn off or switch to answer mode. Lessons combine randomly generated and fixed sequence questions, and depth is usually dependent upon the student's success rate. Questions in the drill sections are randomly generated with immediate feedback provided after each problem and a cumulative score kept throughout the drill. A correct answer results in one of a variety of positive phrases being displayed; an incorrect answer results in a series of hints being given to guide the user to the correct answer.

BUMBLE GAMES

DESCRIPTION

Title: Bumble Games
Authors: Leslie Grimm
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subjects: Mathematics, Early Childhood
Topics: Plotting number pairs, using number positions to name positions in an array and points on a grid.
Components: 1 diskette and backup, teacher guide (46p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor
IBM PC Family, 64K, color monitor, joystick optional
Other formats available (not evaluated): Atari, Commodore 64
Alberta Education Call No.: QA 90 B941g 1982

Version: 1982
Display Language: English
Cost: $85.95 (1985)
Tel. #: (416) 447-5101
Users : Ages 4 to 10

OBJECTIVES

"Bumble Games" is a set of six programs designed to introduce the use of number pairs to named positions in an array and to points on a grid.

PEDAGOGICAL CONTENT DESCRIPTION

This disk consists of 6 programs:

1. FIND YOUR NUMBER: The student is introduced to the concept of a number line (1 - 5 parameters) and is asked to guess the location of a "special" number hidden on it.
2. FIND THE BUMBLE: A creature named "Bumble" hides in a random fashion on a 4X4 grid. The student is asked to find him by specifying coordinates.
3. BUTTERFLY HUNT: Similar in format to "Find the Bumble", in this game students attempt to find a lost butterfly by specifying locations on a 5X5 grid.
4. VISIT FROM SPACE: Students pinpoint the location of a space ship by specifying points on a grid.
5. TIC TAC TOC: Two students compete to line up four coordinate positions in a straight line either diagonally, horizontally or vertically. The program allows for more than one game, and a tally is kept of winners.
6. BUMBLE DOTS: This game displays a 10X10 grid and provides two options: the student can choose to name each coordinate position prompted by the computer and thus eventually disclose a join-the-dot computer-drawn picture or (s)he can input his/her own coordinates and the computer will join the dots, thus allowing the student to creatively "draw" a unique picture.

PEDAGOGICAL CONTENT EVALUATION

Since each game is progressive in difficulty, sequencing is excellent. Range and depth are appropriate for the target audience and graphs, plotting, and number lines are taught in an orderly fashion through randomized questions posed in a game format.

Although the manual which accompanies the program describes the games, it does not provide rationale or objectives (these are given on the disk package itself) and it has no specific information to help the teacher integrate the program into the basic curriculum.

The programs have some value in achieving graphing objectives specified for grades 1 to 5 in the Alberta program of studies (Mathematics). They go beyond grade 1 and 2 objectives in graphing, covering objectives found in grades 3, 4 and 5. The resource can also be used to develop problem solving skills, especially if students are given some teacher guidance in developing more efficient ways of solving the games. The resource does not cover grade 6 objectives and would probably not maintain the interest of students at this grade level.

INSTRUCTIONAL FORMAT DESCRIPTION

Playing instructions are optionally available for every game. Feedback is immediate: a correct response is rewarded with a message or optional tune and incorrect responses receive unlimited clues in both written and graphic form (e.g. arrows to indicate direction).

INSTRUCTIONAL FORMAT EVALUATION

"Bumble Games" successfully meets its objectives via a well-ordered, increasingly difficult six game structure. Instructions are clearly and concisely written and pose no difficulty for the upper end of the target audience; enough reading is required, however, that students younger than grade two may require assistance. Student interaction is frequent and consistent, and feedback is immediate, non-threatening and corrective where necessary. The deductive approach of providing endless clues is appropriate for the game format as it allows every student to succeed, although some students may take a longer period of time. Effective branching allows total user control of sequence, rate and amount and enables easy exit of any program at any time.

The program could be improved by including an evaluation system to aid in student placement and to assess what learning has taken place. Similarly a management system to keep track of student progress would be a real asset.

TECHNICAL CHARACTERISTICS DESCRIPTION

Each program uses graphics, color and sound (optional).

TECHNICAL CHARACTERISTICS EVALUATION

The program is colorful, attractive, and motivating. The appealing graphics make the program fun to use and the flashing numbers, musical tones and personalized comments maintain interest. Unanticipated responses are not allowed and are accompanied by a written message, yet abbreviations for common responses are accepted. Transition between programs is very smooth and logical and all output is well formatted to maximize perceptual impact.

The only problem found with technical design was that the upper case "D" and "O" appeared the same on the screen--this could cause some confusion.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 12 small pages. No teacher support materials are available. The Addison Wesley educational version has an extensive teacher's guide which includes general notes on teaching with computers, full descriptions of the programs and many suggested on-line and off-line activities in black-line master form. The educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The Learning Company package is intended for home use and little support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the programs into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

The progressively sequenced games, through their excellent technical design, are interesting and motivating. Younger students may require assistance reading the instructions and operating some of the advanced games.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. However, in reviewing the IBM version, no notable differences were found.

STATUS

The Apple and IBM versions of "Bumble Games" have been designated as **SUPPLEMENTARY** learning resource in elementary mathematics.

PURCHASE INFORMATION

This product may be purchased for $39.95 U.S. (Apple version, 1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $85.95 (Apple version, 1985) from Addison Wesley at the address given at the beginning of the report. (Note however, that as of April 1985, no IBM version was available from Addison Wesley). Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

BUMBLE PLOT

DESCRIPTION

Title: Bumble Plot
Authors: Leslie Grimm
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subjects: Mathematics
Topics: Coordinate graphing, using pos/neg numbers to name points on a quadrant grid, plotting number pairs.
Components: 1 diskette and backup, teacher guide (44p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
IBM PC family, 64K, color monitor
Other Formats Available (not evaluated): Atari, Commodore 64
Alberta Education Call No.: QA 90 B941p 1982

Version: 1982
Display Language: English
Cost: $85.95 (1985)
Tel. #: (416) 447-5101
Users : Ages 8 to 13

OBJECTIVES

"Bumble Plot" is designed to build a student's plotting and graphing skills.

PEDAGOGICAL CONTENT DESCRIPTION

This diskette contains five programs of sequential difficulty:

1. TRAP AND GUESS: The student tries to "trap" a secret number by identifying paired limits (between -3 to +3) on a number line displayed either horizontally or vertically. When (s)he has "trapped" the number by successfully entering a number on either side of it,(s)he then attempts to guess the actual secret number.
2. BUMBLEBUG: By choosing grid locations, the student sets a trap to catch Bumblebug.
3. HIDDEN TREASURE: By naming coordinate positions, students attempt to find underwater treasures on a -5 to +5 quadrant grid. Arrows and written clues are used to aid the search.
4. BUMBLE ART: Using a -10x10 grid, "Bumble Art" provides two options: (1) "Bumble Pictures" allows students to reconstruct one of seven pre-programmed pictures by entering coordinates on the grid (2) "Make Your Own Picture" allows the student to "draw" his/her own picture by entering coordinates of his/her own choice.
5. ROADBLOCK: By moving roadblocks on a -5 to +5 quadrant grid, students attempt to prevent a bank robber from escaping. An optional 500 second timer adds challenge to this program.

PEDAGOGICAL CONTENT EVALUATION

This diskette is designed to complement and expand the skills taught in "Bumble Games". It contains five challenging sequential games that can be effectively used to achieve several geometry and graphing objectives specified for Alberta Division II mathematics. The "Roadblock" program presents a good opportunity for exercising problem solving skills. Other programs offer opportunities to develop search strategies looking for numbers hidden on a number line or a grid. As negative numbers are outside the Alberta curriculum for Division I students, this diskette would not be generally appropriate for students in grades 1 - 3.

The manual that accompanies the program is written with the student in mind. It contains a vivid description of each program, but it does not include developer's rationale, objectives or teaching implementation strategies. The activity cards are effective in providing extra practice in plotting and reading coordinates.

INSTRUCTIONAL FORMAT DESCRIPTION

This diskette uses a game format to provide drill and practice in graphing techniques. Correct responses are rewarded with messages, occasional graphics, and a cheerful tune while unlimited clues are given to aid the student who has made an incorrect response.

INSTRUCTIONAL FORMAT EVALUATION

The instructional format is effective. There is a great deal of student participation, input is requested in a clear manner that leaves no confusion about what is expected and there is random generation of activity "questions". Also, an example of how to play each game is available, feedback is appropriate, and with the exception of "Roadblock" where a time element is introduced, rate and amount are user controlled.

As students may experience some initial difficulty in playing "Roadblock", an option to review the directions without interfering with the progress of the game would be helpful. Also, the strength of the program could be improved by including a pre-test to enable placement of students at the appropriate level and by incorporating a record management system to keep track of student progress.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color and animated graphics are used in each program and sound is optional. Branching allows the reading/bypassing of instructions or the exiting of any game at any time.

TECHNICAL CHARACTERISTICS EVALUATION

"Bumble Plot" makes excellent use of the capabilities of the computer to enhance the presentation of content. Color, graphics and sound combine to provide attractive, interesting, and challenging games. Being menu driven, the diskette is very easy to use. The program has been effectively bomb proofed. All unnecessary keys have been disabled, yet students can easily change an answer at any time before pressing "return".

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 12 small pages and 4 activity cards. No teacher support materials are available.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, full descriptions of the programs and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, little support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the programs into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

Colorful depictions, animated graphics and motivational sound combined with the progressive sequenced structure make this diskette a useful tool for reinforcing graphing techniques. The creative possibilities of "Bumble Art" and the arcade-like challenge of "Roadblock" provide repeated interest. Weaker students may encounter difficulty dealing with negative integers and coping with the progressive difficulty of each game but the students who used the diskette during the evaluations generally found it to be very motivating. It should be noted that the content is not suitable for students in Divsion I.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. However, in reviewing the IBM version, no notable differences were found.

STATUS

The Apple and IBM versions of "Bumble Plot" have been designated as **SUPPLEMENTARY** learning resource in elementary mathematics.

PURCHASE INFORMATION

This product may be purchased for $39.95 U.S. (Apple version, 1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $85.95 (1985) from Addison Wesley at the address given at the beginning of the report. (Note however, that as of April 1985, no IBM version was available from Addison Wesley). Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

COMPUTER GRAPHING EXPERIMENTS Vol. 1
COMPUTER GRAPHING EXPERIMENTS Vol. 2
COMPUTER GRAPHING EXPERIMENTS Vol. 3

DESCRIPTION

Titles: Computer Graphing Experiments Volumes 1,2 & 3
Authors: Charles Lund & Edwin Andersen
Publisher: Addison Wesley (Canada) Ltd.
Source: P.O. Box 580, 36 Prince Andrew Place, Don Mills, Ontario, M3C 2T8
Subjects: Mathematics; teacher utility (demonstration)
Topics: Vol. 1: Linear & quadratic functions & inequalities, absolute value, polynomials, exponential & log. functions.
Vol. 2: Sine, cosine, cotangent, period, amplitude, phase shift and polar coordinates.
Vol. 3: Parabolas, ellipses, hyperbolas, general quadratic functions, inequalities.
Components: For each volume there is 1 diskette, 1 backup, suggested experiments & black line masters
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 39.2 A225 L962 v1 (v2,v3) 1982

Version: 1982
Display Language: English
Cost: $79.20 each (1983)
Tel. #: (416) 447-5101
Users : High School

OBJECTIVES

To allow students to quickly see and study graphs of the elementary functions encountered in high school courses from algebra through pre-calculus mathematics.

PEDAGOGICAL CONTENT DESCRIPTION

Volumes 1-3 present graphing utility programs which will graph specific functions. The student inputs the parameters in response to questions from the computer. The range of the content is indicated above.

The instructional aspect of these programs is provided through experiments included with each volume. These experiments suggest functions to be plotted and ask the user to make conclusions based on the results. Sixty-seven experiments are available in the three volumes. Answers for most of the suggested activities are provided in the documentation.

PEDAGOGICAL CONTENT EVALUATION

Sufficient range and depth are provided in these volumes. The student is able to lead himself/herself through the simple problems to more difficult ones.

The support materials are essential if the student is to work through this material on his/her own. Experiments are suggested and the worksheets provide a beginning. However, these can easily be expanded by the teacher.

Graphs can be overlaid on the same plane thereby easily showing a relationship between equations when a change is made. A color monitor is desirable but is not essential.

Some graphs which are plotted in Volume 1 should have a check made on the domain. The program allows input of positive and negative constants but does not check to determine if the ordered pairs are within the limits of the screen.

INSTRUCTIONAL FORMAT DESCRIPTION

This is a graphing utility package which provides teacher and student with a tool which may be used to see the relationships between graphs. The student interacts with the program by choosing the function desired. Constants and coefficients are then entered. The user is also given the option of overlaying one graph upon another. Within the print materials, the user completes charts which are designed to point out interrelationships. (S)he also answers questions which are designed to point out the pertinent characteristics of each function.

The feedback consists of the graph which is drawn in response to the student's inputs. Incorrect entries result in the questions on domain and range being reposed.

The programs are linear in design once the program has been entered. However, the teacher and/or the student has the choice of which function to study. The user may return to the main menu after each function is graphed. The user controls the sequence, the number of questions and the length of time that the graph remains on the screen.

INSTRUCTIONAL FORMAT EVALUATION

This series of programs is not drill and practice or tutorial in nature and as a result it may be considered as "non-instructional". The programs are written in such a way that a teacher may use them in a classroom to demonstrate the graphing of mathematical functions and these programs will contribute effectively to that type of instruction.

The package may be considered partly instructional if the user completes the experiments suggested in the documentation. In this case, the package may again be effective. However, it is the print material which will be providing the instruction. The computer package is used solely as a tool. The programs themselves offer no instruction or help to the student. No evaluation of the student input is provided, the user is not required to enter any conclusions and no instruction is provided on any aspect of the function being investigated in the computer part of the package.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphs are displayed using high resolution graphics. No text is used other than to give instructions to the student about entering numbers. Graphs are displayed in color but a color monitor is not essential to the program.

TECHNICAL CHARACTERISTICS EVALUATION

It is possible to have too many graphs on the same screen but this is controlled by the user. One other weakness is the amount of shading in the graphing of inequalities. Crosshatching may have been a better technique.

The program has a number of minor bugs. For example, when drawing a circle with a radius of an irrational. number, a "hole" is left in the figure. Also, responses to illegal entries are at times unsatisfactory (e.g. input of 0 for the value of A in the function " Y = AX^2 " causes the program to flip back to the menu). In addition, the instructions are not always clear as to what actual input is necessary.

Generally, the program is effective in its technical design and is relatively easy to use provided that instruction on the function is given prior to its use.

SUMMATION

The major strength of this package is that it allows a teacher to utilize a computer in a classroom setting as a teaching tool. A sufficient range of situations in each graphing experiment is given to allow students to explore new areas on their own. Ample opportunity is provided for discovery and experimentation.

The weakness of the package is that its effectiveness is dependent upon the print materials and the diligent completion of the suggested tasks. Explanations, instructional assistance and explanatory feedback are not provided.

STATUS

"Computer Graphing Experiments, Volumes 1,2, and 3" have been designated as **RECOMMENDED** learning resources.

PURCHASE INFORMATION

Alberta schools may purchase these products from the School Book Branch for approximately $55 each (1984). Each volume comes with a backup diskette. Additional diskettes may be purchased for approximately $23.

Defective diskettes will be replaced through the S.B.B. without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced free of charge in the first year. After one year, diskettes may be replaced through the S.B.B. for $11.00 approx.

The products have the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

COUNT AND ADD

DESCRIPTION

Title: Count and Add
Authors: Steketee Educational Software
Publisher: EduSoft
Source: P.O. Bcx 2560, Dept. 50, Berkeley, California, 94702
Subject: Mathematics
Topics: Basic counting and addition skills
Components: 1 diskette, guide (3p.), backup copy may be made.
System Requirements: Apple II+/IIe/IIc, 32K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 115 C855 198-

Version: 1982
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (415) 548-2304
Users : Ages 4-9

OBJECTIVES

Young children will learn basic counting and addition skills through four related programs.

PEDAGOGICAL CONTENT DESCRIPTION

In "Count", the user is required to count colored objects.

"Add1", "Add2" and "Add3" ask the user to add objects (maximum of 16 in each group). The difference between the programs is in the amount of concrete assistance given. "Add1" requires the user to count two groups of objects and the objects are then moved together for the determination of the sum. "Add2" presents objects to be counted and then added but does not move them together. In "Add3" the user adds digits without the assistance of concrete objects. If an error is made, the feedback presents objects to be counted and added.

Five questions are provided in each round for each program. At the end of each round the student may continue or be returned to the menu.

The programs are sequenced internally. Success in any program leads the student to more difficult questions in that same program. In "Count" this means progression of up to 56 objects to be counted. In the adding programs, the ceiling is adjusted up to a maximum of 16 in each group. Lack of success results in regression to an easier level. As no records are kept, this progression and regression is available only during the sitting.

The teacher can adjust maximum ceilings, initial ceilings and number of questions by changing the program listing. Instructions on how to do this are given in the documentation.

PEDAGOGICAL CONTENT EVALUATION

The sequencing is excellent. Not only is there increasing difficulty in the size of questions, but also there is a sequence from concrete to abstract. The material in one program is built upon the content and presumed success in previous program(s). The amount of practice is good. The content range is somewhat limited but the price of the diskette reflects this limitation.

The content is appropriate to students in division 1. The material presented (recognizing, knowing and learning number facts) provides for effective, worthwhile and constructive practice in this area.

Teacher control of parameters is another good feature.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entry of numerical answers, depression of the space bar to continue, selection of menu items and decisions on continuing.

Positive feedback ("YES" plus an audio signal) is given immediately after each correct intermediate and final answer.

There is a range of negative feedback methods. On any counting question or subquestion, the first error results in the objects being counted for the user. The user is then expected to put in the correct answer. If an error is made again, the correct answer flashes a number of times and then remains on the screen. The next question or subquestion is then presented.

Depending upon the level of assistance presented in the question, errors on adding questions result in the user receiving progressively more concrete forms of assistance. The user will progress through the following sequence as (s)he continues to have difficulty with the question: 1) concrete objects are shown; 2) the concrete objects are moved together; 3) the concrete objects are counted; and 4) the correct answer is flashed.

Quantitative feedback consisting of a percentage score and the level of difficulty attained is provided at the end of each round if the teacher wishes it.

INSTRUCTIONAL FORMAT EVALUATION

Apart from some possible confusion in a user's first question, the interaction is good. In "Count", does the user count the number of objects from 1 to N or does (s)he enter the total number? This will occur only on that first question.

The feedback is very good. The amount of assistance increases with the difficulty of the program and it utilizes the skills the user has already gained. It may have been advantageous to provide the user with more than one attempt at a question before providing remediation. Users in this target audience may frequently make entry errors and they may be frustrated by the unnecessary feedback.

TECHNICAL CHARACTERISTICS DESCRIPTION

Numbers and objects are presented in large size, high resolution characters. Color and sound are also used. The teacher may eliminate the sound by making a change in the program listing.

TECHNICAL CHARACTERISTICS EVALUATION

Graphics are large, clear and effective.

There are a few minor weaknesses. In counting large numbers, it would have been preferable to have the numbers grouped in sets of 10. Sound reinforcements may become monotonous and/or distracting, however, they may be eliminated. The program could be more user friendly by asking for and using the student's name. Also an option in the menu to exit from the program should be added.

SUMMATION

This diskette does a very good job in achieving its objectives. Content sequence and depth are both good. Feedback is excellent. The sequence from easy to difficult and from concrete to abstract both in the content and in the feedback is an outstanding feature.

Very usable, educationally sound programs are provided at a very reasonable price. The ability to make a backup copy enhances the use in a primary classroom.

STATUS

"Count and Add" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (Oct. 1984) from EduSoft at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. There is no warranty for diskettes which become inoperable through normal use; however, a backup copy may be made.

Alberta distributors include Alphatel Computer Products and Edupro Software. Contact these companies directly for price and warranty information (see page v. of the preface).

As the diskette is accessed every time a new program is required, and as the programs are of short duration, a diskette may be used with only one computer at a time.

ELEMENTARY MATH DRILL

DESCRIPTION

Title: Elementary Math Drill
Authors: E. W. Romaniuk, D. Lee & B. Spindler
Publisher: ECR Educational Consultants
Source: c/o Alphatel Systems Ltd., 11430 - 168 Street, Edmonton, Alberta, T5M 3T9
Subject: Mathematics
Topics: Fundamental operations with whole numbers and decimals; metrics
Components: Management diskette, program diskette, guide (48p), single or dual drive versions
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, dual drives and a printer are optional
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 139 B433e 1982

Version: 3.01
Display Language: English
Cost: $149.95 (1984)
Tel. #: (403) 451-5761
Users : Grades 3-5

OBJECTIVES

To provide drill on the four basic mathematical operations of addition, subtraction, multiplication and division.

PEDAGOGICAL CONTENT DESCRIPTION

The program generates drill questions for grades 3,4 and 5. Each grade is divided into 24 chapters and each chapter consists of a pre-test, five lessons and a post-test. Each lesson may be presented in one of five levels of difficulty as determined by preceding session results. Both tests are presented at the top difficulty level.

The range covers whole numbers, decimals and metrics. Generally, 10 questions per lesson are presented but this may be modified by the teacher. All four operations are integrated within a spiral approach.

PEDAGOGICAL CONTENT EVALUATION

The range, sequence and depth of the content are all appropriate to the target audience and to the objectives of the program. The sequence, while following a development of easy to hard, does not allow the teacher to easily give practice in one particular operation nor does it necessarily follow the sequence of the Alberta curriculum. Teacher control is necessary.

With teacher intervention, the content can be rated very highly.

INSTRUCTIONAL FORMAT DESCRIPTION

Students answer questions as in a paper/pencil format. The feedback consists of a large "X" or a check mark. The correct answer is also given if the input is wrong. Sounds and other messages provide hints but otherwise there is no remediation or help available. Quantitative results are given at the end of the lesson.

Pre-tests and post-tests are available for each chapter with the results stored in the student management file. Pre-test results determine the difficulty level for the first lesson. These difficulty levels provide students with varying routes through the continuum.

Unless changed by the teacher, the sequence is controlled by the program. Once installed in a chapter, the user's progress is determined by the program and his/her results. The number of questions is similarly controlled by the program or by the teacher through the management system.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is good and the feedback, although limited, is well done. The presence of pre/post tests is good, although their potential effectiveness is somewhat limited by a lack of diagnosis and prescription. Sequence, rate and amount are all appropriately controlled.

The program does attempt to adjust the level of difficulty if the user does poorly but it is not designed to provide any feedback beyond an indication of the correct answer. The student must be familiar with the material before starting the chapter. The lack of instruction and remediation limit the program's potential use.

No matter how well or poorly a student performs, the program advances him/her to the next lesson; therefore close monitoring by the teacher is required.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are shown in standard sizes. Sound is used to cue the student to various input errors. Graphics are used in the metric questions.

TECHNICAL CHARACTERISTICS EVALUATION

There may be minor problems with a lack of sufficient direction on the screen to the user. Also, the small size of the digits may create problems for younger students or for classes without a good monitor. Generally, the technical quality is very good.

IMPLEMENTIONAL SUPPORT DESCRIPTION

Through the management system, the teacher is able to control the following parameters: minimum number of questions, number of attempts per question, allocation of extra questions, time limits, and starting location in the course. Reports of various kinds are also available and all the necessary features for entry of data are available.

The management system guides the user through the lessons and determines which level of difficulty will be presented. Success on a previous lesson determines whether the level will be altered.

Records for 40 students and up to 200 sessions can be kept. It is advisable for each teacher to have his/her own data management diskette.

The 48 page teacher's guide contains instructions on operating the management system as well as general operating information and drill contents.

IMPLEMENTATIONAL SUPPORT EVALUATION

Weaknesses include:

1. The management system is designed to collect data and not to prescribe or evaluate.
2. A student who fails an entire chapter can still be advanced to the next chapter. A mastery level is not required before advancing.
3. A student is allowed to remain at the bottom level throughout a chapter but the test is presented at the top level of difficulty.
4. There is no provision to advance a student who scores well on the pre-test.

While these disadvantages can be circumvented, it requires close teacher supervision of each student. The management system is strong in providing the teacher with a great deal of flexibility in meeting the needs of the individual student in specific lessons.

The ability to control the number of questions, the number of attempts per question and the amount of time given to each student are major strengths.

SUMMATION

Major advantages include the development of the content, the flexibility and control provided to the teacher and the features of the management system. Disadvantages include the progression from pre-test to lesson and from one chapter to another without regard to results, the lack of mastery level requirements and the lack of remediation. Most of these problems can be overcome somewhat through regular supervision by the teacher. The program will not stand on its own but through utilization of the management system features, it will assist the teacher in providing his/her students with arithmetic practice.

STATUS

"Elementary Math Drill" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

A single disk drive version or a dual drive version is available for $149.95 from Alphatel Computer Products (see page v. of the preface). Defective diskettes will be replaced without charge within a 30 day warranty period. There is no warranty for diskettes which become inoperable through normal use.

The diskette(s) may not be used with more than one computer at a time.

EQUATIONS

DESCRIPTION

Title: Equations
Author: Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Mathematics
Topics: Equations of the form Ax + B = C
Components: 1 diskette, backup, guide (1p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
IBM PC family, 64K, monochrome monitor
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari
Alberta Education Call No.: QA 214 E645 198-

Version: 1982
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 7-11

OBJECTIVES

To give students in grades 7-11 drill and practice in solving equations of the type "Ax + B = C".

PEDAGOGICAL CONTENT DESCRIPTION

The program provides drill and practice on the procedures for solving simple linear equations.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. Following the instructions, the user is given random equations with integer solutions. In order to solve the problem, the user must select from a list of operations (addition, subtraction, multiplication, division and simplification). Upon inputting the correct operation, (s)he must then perform the operation. The computer modifies the equation appropriately and then resumes the solution process.

The user selects the number of questions (1-9) to be attempted.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence of the content are very limited in that only one small skill is addressed and there is no development of sequence within that objective. While that one operation has been covered well, the value of the diskette would be greater with a wider range. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength to the program.

The content is not particularly applicable to the designated target audience (grades 7-11). Except at grades 7-8, the depth and range of the coverage do not provide much challenge and the program would be useful in the higher grades for remediation only.

The program is basically remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

The student works through a problem step-by-step by identifying appropriate processes and entering the needed changes. Correct answers to the sub-questions result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of terms result in a brief remedial statement. These statements may direct the user to the correct operation or may show a correct simplification. The correct answer must be entered before the user can proceed. The program will accept different forms of the correct answer, e.g. adding -3 or subtracting 3.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

A weakness is the lack of an evaluation component (pre-test/post-test) and the lack of different levels of difficulty. These would provide more flexibility in dealing with students with varying abilities.

In general, the instructional format of this drill is good.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into two areas: original problem and work space. As the question is solved, the work space is modified but the original question remains untouched.

The inverse mode is used to highlight important pieces of information.

TECHNICAL CHARACTERISTICS EVALUATION

The screen is easy to read, but building and maintaining the full solution of the equation on the screen would have been desirable.

The technical design of the program is satisfactory.

SUMMATION

This program meets its specific objective very well. Content depth and feedback techniques are both very good. The diskette is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remediation.

The limited content range is a disadvantage and the structured approach may be boring to students who have the necessary skills. Students may find the absence of all the steps in the solution to be confusing. Also the quantitative feedback could provide more information to the teacher.

These weaknesses are minor when compared to the overall quality of the program.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. In reviewing the IBM version, it was found that the IBM version did not differ in any substantial fashion.

STATUS

The Apple and IBM versions of "Equations" have been designated as **SUPPLEMENTARY** learning resources.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (Apple, 1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

EXPLORER METROS

DESCRIPTION

Title: Explorer Metros
Authors: David Burgess et al
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, New York, 10570
Subjects: Mathematics; science
Topics: Metric system (mass, capacity, length and temperature)
Components: 1 diskette, 1 backup, teacher's guide (27p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QC 91 E96 1982

Version: 1981
Display Language: English
Cost: $49.00 U.S. (1984)
Tel. #: (914) 769-5030
Users : Grades 4-9

OBJECTIVES

Students will:

1. Become accustomed to using units of metric measurement.
2. Understand the relationship between different sizes of metric units.
3. Correctly estimate quantities using situations involving metric measurement.
4. Understand the connection between a specific metric unit and its appropriate use.

PEDAGOGICAL CONTENT DESCRIPTION

The program is a space simulation/game designed to assess and challenge a student's ability to deal with metric estimation. Users explore a space colony and encounter situations requiring them to make choices based on an understanding of metric measurement.

The student is faced with 12 "encounters" to solve. These may involve metric mass, length, capacity or temperature. In each encounter, the user is asked to select an option describing the correct action to take in the situation described. Assistance is available to the user if (s)he wishes it. A metric conversion chart may be viewed or advice from the user's robot may be obtained. The chart relates metric dimensions to familiar objects (e.g. raisins, apples). The user is advised that the robot's advice is not always accurate (90% accuracy).

The user has 8 game "hours" to complete the exploration. Success in an encounter costs him/her half an hour whereas failure uses up an hour. Asking the robot for help costs the user 15 minutes. If the user completes 12 encounters within the time limit, (s)he is awarded the rank of "master metric explorer". Failure results in being "beamed" back aboard, presumably in disgrace.

PEDAGOGICAL CONTENT EVALUATION

Content range, sequence and depth are all satisfactory. The game provides an interesting way of reviewing or drilling metric system material. Prior instruction is necessary.

The content does not meet SI conventions with respect to symbols and spelling.

INSTRUCTIONAL FORMAT DESCRIPTION

Students interact with the program by entering a multiple choice option.

The program draws encounters randomly from a bank of 27 problems. Encounters are not repeated in any one sitting. The metric dimensions in each encounter are also randomized so that if a user does face the same challenge in another exploration, the metric value, and thus the correct option, will be different.

Positive feedback consists of a congratulatory statement and the deduction of half an hour. Negative feedback consists of a textual statement and the loss of an hour. There is no quantitatve feedback.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design is generally good. The randomization of the questions and the randomization of the measurement quantities allow the program to be used a number of times without loss of motivation.

The negative feedback tends to be inadequate. The user is informed that (s)he made the wrong choice and at times the message will indicate what the correct answer should have been. However, often it is not clear enough why the choice was wrong. Also, the negative feedback tends to be "smart" and this may tempt students to err on purpose so that they can see what the program will say.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in high resolution graphics in upper and lower case letters. The encounter is also accompanied by a graphics picture which may or may not have color.

TECHNICAL CHARACTERISTICS EVALUATION

Only 20 pictures are available and as a result they are not always appropriate to the encounter. As the graphics are not essential and do not add much instructional value, the program works equally well on a monochrome monitor.

There are frequent delays as the program accesses the diskette for each encounter. Other aspects of technical design are satisfactory.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

An editor function allows the teacher to: 1) enter an encounter, 2) change an encounter, 3) display an encounter, and 4) delete an encounter. Instructions for making these changes are available in the documentation.

The program has space for 36 encounters, 9 for each of the measurements of mass, capacity, length and temperature. Twenty graphical pictures are available.

IMPLEMENTATIONAL SUPPORT EVALUATION

Detailed instructions are available to the teacher for changing or entering encounters. Teachers should not find these functions difficult to use. This feature of the program increases the usability of the diskette considerably, not only in increasing the variety of encounters that are possible but also in increasing the range of the target audiences.

SUMMATION

The weaknesses of this program are the ineffective graphics, the absence of SI metric conventions and the finite number of challenges programmed on the diskette. However, two of these weaknesses are surmountable through use of the editor.

The advantage of the game is the motivation it brings to metric review. The game is fun, it presents metric problems in an interesting fashion and it is relatively inexpensive. For teachers willing to use the editor, the value of the diskette is expanded considerably.

STATUS

"Explorer Metros" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

The product may be purchased for $49.00 U.S. (Dec. 1983) from Sunburst Communications at the address given at the beginning of the report. Replacements are free, for any reason, during the publication life of the product. Additional diskettes may be purchased for $10.00 U.S. from the producer. Note that the package comes with a backup diskette.

In Alberta, the diskette may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

As diskette access is frequent, use of a diskette is limited to only one computer at a time.

EXPONENTIAL NOTATION

DESCRIPTION

Title: Exponential Notation
Series: Mathematics for Science
Author George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 27 Armstrong Ave., Georgetown, Ontario, L7G 4X6
Subjects: Mathematics, science
Topics: Scientific and exponential notation (addition/subtraction, multiplication/division)
Components: 1 diskette and backup, manual (12p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Commodore PET
Alberta Education Call No.: QA 43 M174 1982

Version: 1982
Display Language: English
Cost: $72.00 (1985)
Tel. #: (416) 877-0171
Users : Junior/Senior High

OBJECTIVES

Learners will be able:

1. To change numbers written in ordinary form into scientific notation.
2. To change numbers written in scientific notation into ordinary form.

PEDAGOGICAL CONTENT DESCRIPTION

This diskette contains three programs, each containing two independent lesson and drill sections which are user selected from a menu:

1. SCIENTIFIC NOTATION: The lesson begins by defining scientific notation and justifying its use by showing how it shortens long numbers and how it can remove the ambiguity in the number of significant digits contained in some quantities. The program then reviews positive and negative exponents and teaches conversion from ordinary to scientific notation and vice versa through a four-step work-through process. (Students must answer two consecutive questions correctly before being allowed to continue to the next stage of the program.)
2. ADDITION AND SUBTRACTION: This program briefly reviews and tests a student's understanding of scientific notation and then proceeds through a detailed solution of a problem involving the addition of two numbers written in scientific notation. If successful, the student is presented with three additional variations on the problem of addition of numbers written in scientific notation which involve rounding off answers. Detailed corrective feedback is provided to guide student responses. A similar format is used to teach subtraction of numbers written in scientific notation.
3. MULTIPLICATION AND DIVISION: This program begins with a check on the student's ability to multiply and divide simple powers of 10 and then follows a similar procedure to the "Addition and Subtraction" program to teach multiplication and division of numbers written in scientific notation. A paper and pencil approach is recommended.

All lessons are followed by a 10 question, cummulatively scored drill on the concepts presented in the program. (1 mark is given for a correct answer, 0.5 for a correct answer containing a format error, and 0 for an incorrect answer).

PEDAGOGICAL CONTENT EVALUATION

This diskette effectively meets its objectives and the programs are presented in a well-sequenced manner. Range is appropriate for the target audience and satisfactory depth is generally achieved since program routing is dependent upon student success. The lesson portion of the "Multiplication and Division" program tends to use examples with only positive exponents. Minor inconsistencies in format were also noted. (E.g. In some cases, numbers less than one required a zero before the decimal; in other cases they did not.)

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of choosing a lesson or drill from a menu, using the space bar for page turning and entering numerical inputs. Lessons utilize randomly generated questions to lead a student through a step-by-step understanding of the concept being taught. Depth is usually dependent upon student success rate. Questions in the drill sections are randomly generated with immediate feedback provided after each problem and a cummulative score kept throughout the drill. A correct answer results in one of a variety of positive phrases being displayed; an incorrect answer results in a series of hints to guide the user to the correct answer.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is generally appropriate to the target audience, with well-designed pre-test activities to check student readiness. One may question whether obtaining two correct answers in succession is sufficient to indicate mastery of the concept presented in the lesson since accurate results could conceivably occur by accident when dealing with such a narrow range. Randomized drill questions effectively test student understanding of the concept(s) presented in the lesson, and the hints provided in the corrective feedback lead a student to analyze errors and so encourage corrective learning. Student interaction is meaningful and consistent. The addition of instructions regarding which format to use and what constitutes a format error would be helpful.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in combination upper/lower case with true superscripts used for exponential notation. Color, flashing and underlining are used to highlight certain parts of the text. Aural feedback is available at the start of each program segment.

TECHNICAL CHARACTERISTICS EVALUATION

Text displays are well-organized and readable and make good use of selective scrolling to keep important material on the screen. Sound is appropriately user controlled. The program is bombproof and traps invalid inputs. Some timing loops in the lessons are too slow (e.g. the printing of scientific notation).

SUMMATION

Active, meaningful student interaction combined with a well-designed feedback system which effectively diagnoses a wide variety of student deficiencies and provides selective statements to student responses make this diskette a useful classroom teaching aid. Minor weaknesses include the lack of consistency in format and the bias toward the use of positive exponents in lesson examples.

STATUS

"Exponential Notation" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $72.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire "Math for Science" series is available for $217.00. It consists of four individual packages each of which has been given a supplementary status ("Measurement", "Basic Math Techniques", "Exponential Notation" and "Miscellaneous").

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for pricing and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

FRACTIONS/DECIMALS

DESCRIPTION

Title: Fractions/Decimals
Authors: Courses by Computers Inc.
Publisher: Sterling Swift Publishing Company
Source: 7901 South IH-35, Austin, Texas, 78744
Subject: Mathematics
Topics: Operations with fractions and decimals
Components: 6 diskettes, teacher's guide (64p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 117 E38 1982

Version: 1981
Display Language: English
Cost: $495.00 U.S. (1984)
Tel. #: (512) 282-6840
Users : Grades 4-9

OBJECTIVES

To provide drill and practice (with some tutorial instruction) in operations with fractions and decimals.

PEDAGOGICAL CONTENT DESCRIPTION

Operations with fractions are contained in 13 lessons on three diskettes. Lessons include basic fraction concepts, comparison and equivalence, conversions between mixed and improper fractions, addition, subtraction, multiplication and division.

Five decimal lessons are contained on one diskette. These include lessons on basic decimal concepts, comparing and rounding, adding, subtracting, multiplying and dividing. Each lesson contains a brief tutorial which explains how to do the operation, a set of problems, a choice of doing more questions and a test.

Another program diskette contains four games. The content covers equivalent fractions, reducing fractions and converting mixed numbers/improper fractions. Each game consists of 10 questions which the user attempts to answer as quickly as possible. Selection of the content is done through a menu.

PEDAGOGICAL CONTENT EVALUATION

The majority of the content is on fractions which are not covered until the junior high grades in Alberta. As a result, elementary schools are not encouraged to purchase this package. All materials are clearly stated and logically sequenced.

The depth of the drills is good as students may choose to receive more practice questions. In the tutorials, there are one or two examples per lesson, each of which is worked through step-by-step. This will likely be insufficient if the student has not been previously introduced to the concept. An option of receiving more examples or skipping the tutorial would have been advantageous.

The range and depth of the games are appropriate to the objectives of the program and the target audience. They are intended however only to provide speed drills on the content covered in Fractions Part 1.

INSTRUCTIONAL FORMAT DESCRIPTION

During the drill and test sections, the student is often instructed to work the questions out using paper and pencil. The final numerical answer is then entered. Interaction during the tutorial section is limited to pressing return. In the games, the user enters the numerical answer as quickly as possible.

The student receives immediate feedback after each response. Correct answers receive randomly selected positive reinforcements. The first incorrect response in a drill question results in a hint which is tutorial in nature and is usually directed at the first step needed to calculate the answer. If an error is made again, the student is shown how to do the question and is given the answer. Quantitative feedback is given after tests, at the end of each drill/game and at the end of each diskette.

A pre-test determines at which lesson the student should begin and a post-test determines if mastery has been met. The student is informed of how many questions (s)he will be shown and what the mastery level is. It is possible to get a mark on the pre-test which allows the user to skip the diskette completely or to select any lesson for review purposes. Students who have completed the lessons may also use the programs for review.

INSTRUCTIONAL FORMAT EVALUATION

In the drill sections, the input of only the final answer limits the amount of help that the user can be given. If an error is made, the program can not help the student with any of the intermediate steps. Interaction during the tutorial is also weak as the user is limited to pressing the return key.

Both positive and negative feedback are handled well. The method of giving hints and showing the student how to do it on the second error is a good feature. The quantitative feedback is also good. The user knows how well (s)he is doing at all times.

The availability of pre-tests and post-tests is probably the finest feature of the programs.

The instructional format of the games is adequate; however, they are not really games but are drills with graphical positive feedback. There is no strategy of winning involved other than to enter the answer quickly.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are used for most of the presentation while sound signals that the return key must be pressed. An animated figure and/or direction arrows focus the user's attention to appropriate parts of the display.

TECHNICAL CHARACTERISTICS EVALUATION

The small figure used as a prompt, pointer and positive reinforcement is entertaining and functional without being distracting. The additional graphics used to focus attention may be a bit confusing since the screen can become crowded with arrows and explanations.

The sound may be distracting in the classroom. Also, use of the reset key will crash the program. Otherwise, the technical quality is satisfactory.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teachers may enter, modify or delete class lists as well as update or display student records. Information available includes student names, numbers, passwords, prescriptions, individual records and small group reports. Apart from the individual records, all of the other reports are available only on a printer.

Results are stored on program diskettes which have to be updated onto the management diskette. Five classes with a maximum of 40 students each may be stored.

The teacher may use the management system to override the program's control of the student's sequence; however, this is not recommended by the publisher.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management of the records is adequate. While comprehensive records for all students may be kept, students must be registered on all disks and only a profile of achievement is displayed showing the number of times it takes a user to successfully complete a lesson. Student scores are not kept. Also, the teacher must remember to update this file regularly. The system is somewhat confusing to learn. It has satisfactory features on the registration and manipulation of student lists but it provides only limited information on results.

The sparse documentation on accessing the display data does not make it clear that only hard copy reports are available. Also, evaluators were unable to get group reports.

There may be some difficulties encountered when changes are made to the master diskette if one of the program diskettes is subsequently not accepted. It would be preferable to update the master diskette only after additions or deletions have been made to the four program diskettes.

SUMMATION

The availability of pre-tests and post-tests and the quality of the feedback are strong features. However the interaction is weak and the materials are expensive considering the limited number of grade levels in which they could be used in Alberta. The package is not advised for elementary schools.

STATUS

"Fractions/Decimals" has been designated as a **SUPPLEMENTARY** learning resource for junior high schools .

PURCHASE INFORMATION

This product may be purchased for $495.00 U.S. (Oct. 1984) from Sterling Swift Publishing Company at the address given at the beginning of the report. Subsequent sets purchased by the same account are $295.00 U.S. Defective diskettes will be replaced without charge within the warranty period of 90 days. Damaged diskettes may be replaced for $9.95 U.S. with proof of purchase. There is no time limit for this warranty.

In Alberta, the diskette may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

As the programs are controlled by a management system, diskettes in this package may be used with only one computer at a time.

GERTRUDE'S PUZZLES

DESCRIPTION

Title: Gertrude's Puzzles
Authors: Teri Perl, Leslie Grimm, Warren Robinett
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subject: Problem Solving
Topics: Reasoning skills
Components: 1 diskette and backup, teacher guide (57p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional
Other Formats Available (not evaluated): Atari, IBM, Commodore 64
Alberta Education Call No.: BC 177 G384p 1982

Version: 1982
Display Language: English
Cost: $81.56 (1985)
Tel. #: (416) 447-5101
Users : Ages 6 and up

OBJECTIVES

This diskette is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to solve problems with incomplete information and analyze what they see by moving puzzle pieces to form color and shape patterns.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of three types of puzzles, each having two levels of difficulty. The student manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the user to arrange shapes according to a given rule. The third puzzle requires the user to decide what rule is being applied.

The diskette includes an optional tutorial, instructions for each puzzle, examples of correctly completed puzzles, provision for the selection of different game shapes, and an editing feature whereby new shapes can be created.

PEDAGOGICAL CONTENT EVALUATION

Students from ages 6 and up would find this diskette to be interesting and challenging. The content range, sequence and depth are appropriate and effective. The diskette presents a wide assortment of combinations of various shapes and colors which add to the motivation of the puzzles.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of moving a joystick or a set of keys to move a graphic character (Gertrude the Goose), a rectangle (representing the learner), and various game pieces (colored shapes) around the screen. Numerous branches allow the user the choice of reading directions, selecting the type and number of puzzle to be played, viewing a treasure room, entering a shapes room, calling for help, etc.

Until the puzzle is accurately solved, the program considers it to be in the process of being solved. When a puzzle has been correctly solved, the lines surrounding the puzzle flash and Gertrude delivers a "treasure" (a graphic picture of a prize). After 12 prizes are accumulated, the student is awarded the title "Master Puzzler".

Students having difficulty are given some program help: in one puzzle, the student can press a space bar to make incorrectly placed pieces wiggle; in another, incorrect pieces "fall out" of the puzzle.

INSTRUCTIONAL FORMAT EVALUATION

This is an excellent program for the development of problem solving strategies. The program will recognize more than one correct solution to a problem. This enables the same puzzle to be re-solved a number of times without loss of motivation and student creativity is encouraged.

Feedback techniques could be improved by including help for the student who is having difficulty solving a puzzle or understanding instructions. In addition, older students may not be motivated by the prizes. It is unlikely that many students could be "Master Puzzlers" because of the time needed to solve 12 puzzles in one sitting.

Students will require good psychomotor skills. An equal amount of time is spent on these skills as on the development of logic and pattern recognition. Students may find that the games are very time consuming in the movement of objects but this did not appear to lessen the enthusiasm of test students.

The shapes editing feature is time consuming and unnecessary. Students would probably enjoy creating new shapes but these are not necessary for the development of problem solving abilities and all new shapes are lost when the computer is turned off.

The number of branches and types of control are effective in meeting the needs of the user; however, the teacher has no control over the program. It is unfortunate that the program doesn't include a management system to keep track of students' names, types of puzzles played and the number of puzzles correctly solved.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics and color are employed throughout the programs. Optional sound occurs in the title page (a brief tune), when pieces are picked up or dropped (a beep), and when a puzzle has been solved (a tune).

TECHNICAL CHARACTERISTICS EVALUATION

Color, graphics and sound are generally appropriate and effective. While the displays are clear and well laid out, the vocabulary may be too difficult for young, first-time users. Also, it is easy to accidentally slip out of the page being used and into another but movement back in is accomplished with little effort. Some of the "doors" through which the student must move are not clearly labelled necessitating reference to the map in the student manual or learning through trial and error.

In order to avoid the tutorial and access the puzzles, the learner must demonstrate that (s)he knows how to manipulate the objects. This is accomplished by picking up and inserting a key into a lock. As exact placement is required, this may cause problems even for older users.

The specific sequence of steps that must be completed before a puzzle can be played may be confusing to first-time users. Teachers must be prepared to provide help for these students. Once a user is familiar with the map lay-out and the required movements, it is easy to progress through the program.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 8 small pages and 16 activity cards. No teacher support materials are available.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, full descriptions of the puzzles and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, little support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the puzzles into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

Fine technical design and good user control make these puzzles interesting and challenging. They require a lot of thought and will definitely assist in the development of problem solving skills.

Weaknesses include the lack of helping branches, clues or strategy suggestions and the fact that teachers will likely have to assist younger and less capable students.

STATUS

"Gertrude's Puzzles" has been designated as a **SUPPLEMENTARY** learning resource in elementary mathematics.

PURCHASE INFORMATION

This product may be purchased for $44.95 U.S. (Oct. 1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $81.56 (Canadian) (1985) from Addison Wesley at the address given at the beginning of the report. Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

GERTRUDE'S SECRETS

DESCRIPTION

Title: Gertrude's Secrets
Authors: Teri Perl, Leslie Grimm, Warren Robinett
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subject: Problem Solving
Topics: Reasoning skills
Components: 1 diskette and backup, teacher guide (57p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joystick optional
IBM PC family, 64K, color monitor, joystick optional
Other Formats Available (not evaluated): Atari, Commodore 64
Alberta Education Call No.: BC 177 6384s 1982

Version: 1982
Display Language: English
Cost: $81.56 (1985)
Tel. #: (416) 447-5101
Users : Ages 4-9

OBJECTIVES

This diskette is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to create order and to plan ahead by solving puzzles that involve arranging game pieces according to a given rule or by guessing a secret rule.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of three types of puzzles, each having two or three levels of difficulty. The child manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the student to arrange shapes according to given rules. The third puzzle requires the student to decide what rule is being applied (intersection of sets). The program includes seven rule pages giving instructions for each puzzle, five sample pages showing what a correctly completed puzzle looks like, a branch allowing for the selection of different shapes with which to play, an editing feature whereby new shapes can be created by the teacher or learner and an optional tutorial.

PEDAGOGICAL CONTENT EVALUATION

The content is appropriate and effective in its sequence and is accurate, clear and unbiased. The range and depth are most appropriate for grade 1 and early grade 2 students. The upper end of the target audience (8-9 year olds) will likely find most of the puzzles too easy.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of using a joystick or set of keys to move a graphic character (Gertrude the Goose), a rectangle (representing the learner), and various game pieces (colored shapes) around the screen. By moving the goose and the rectangle through various "doors", the student selects the puzzle to be played and may opt to see a set of printed instructions, a completed sample puzzle, choose the game pieces with which to play, or alter existing pieces to create new shapes.

When a puzzle has been solved, positive feedback consists of the lines surrounding the puzzle flashing and Gertrude delivering a "treasure" to the "treasure room". A solution is never evaluated as being incorrect. Until a puzzle is accurately solved, the program considers it to be in the process of being solved.

There are some clues available to aid the player who is having difficulty solving a puzzle. In two of the puzzle types, incorrectly placed pieces will "fall out" of the puzzle.

INSTRUCTIONAL FORMAT EVALUATION

This is a good program for the development of problem solving strategies in young students. Since the program recognizes different possible solutions, it encourages student creativity and enables re-solving the puzzles a number of times without loss of motivation. The instructional technique, student interaction and evaluation techniques are appropriate and effective. However, the program has only a few provisions for aiding the student who is having difficulty solving a puzzle or understanding instructions.

The shapes editing feature is time consuming and unnecessary. Students would enjoy creating new shapes but these are not necessary for the development of problem solving abilities, and all created shapes are lost when the computer is turned off.

It is unfortunate that the program doesn't include a management system to keep track of students' names, types of puzzle played and the number of puzzles solved.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics and color are employed in the design of the map, the puzzle, Gertrude the Goose, the shapes used for playing and the treasures won. Sound, which is at the user's control, occurs in the title page (a brief tune), when pieces are picked up or dropped (a beep), and when a puzzle has been solved (a tune).

TECHNICAL CHARACTERISTICS EVALUATION

On the whole, color, graphics and sound are appropriate and effective, however, there are a few problems. Although the displays are clear and well laid out, the vocabulary may be too difficult for young, first-time users. It is easy to accidentally slip out of the page being used and into another, but movement back in is accomplished with little effort. Some of the "doors" through which the student must move are not clearly labelled and so the student must either refer to the map in the student manual or learn through trial and error.

Generally teachers must be prepared to provide help for first-time users and younger students.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 8 small pages and 16 activity cards. No teacher support materials are available.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, full descriptions of the puzzles and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, little support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the puzzles into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

These puzzles with their motivating technical design and thought provoking puzzles are particularly suited to the development of problem solving skills in the middle target audience range. The lack of strategy suggestions for students experiencing difficulty is the chief weakness and teacher assistance will be required.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. However, in reviewing the IBM version, no notable differences were found.

STATUS

The Apple and IBM versions of "Gertrude's Secrets" have been designated as **SUPPLEMENTARY** learning resources in elementary mathematics.

PURCHASE INFORMATION

This product may be purchased for $44.95 U.S. (Apple version, 1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $81.56 (Canadian) (Apple version, 1985) from Addison Wesley at the address given at the beginning of the report. (Note however, that as of April 1985, no IBM version was available from Addison Wesley). Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel, (see page v. of the preface). Contact the companies directly for price and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

LASER CHASER

DESCRIPTION

Title: Laser Chaser
Authors: None cited
Publisher: Indian Head Software
Source: 1002 Indian Head Drive, Snow Hill, North Carolina, 28580
Subject: Mathematics
Topics: Addition, subtraction and multiplication of integers
Components: 1 diskette
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 139 L343 1981

Version: 2.0
Display Language: English
Cost: $12.95 U.S. (1984)
Tel. #: (919) 747-2839
Users : Junior High

OBJECTIVES

This diskette is designed to provide drill and practice in the application of integer operation rules involving addition, subtraction, and multiplication.

PEDAGOGICAL CONTENT DESCRIPTION

In "Laser Chaser" the user must correctly answer questions dealing with addition, subtraction and multiplication of integers within the -5 to +5 range. The student can choose whether to have his/her responses timed or untimed. If a timed response is chosen, it is possible to have the time limit gradually reduced or to begin at a fast rate immediately.

The program is presented in game format. The user must determine the answer, locate a cannon over the correct digit on a number line (using the arrow keys) and fire at an invisible ship using the "F" key. If the correct answer is selected, the phantom cruiser is destroyed and the user is awarded 200 points. An incorrect answer results in loss of points. As points are gained, the user's rank increases from private to corporal and upward. The rank of "Commander" is earned at 5000 points. If this ranking is achieved in all three games in one sitting, the user becomes "Supreme Commander". A student may exit the program at any time but will sacrifice accumulated points. There is no management system to record points beyond the current sitting.

Weaker students may choose to move their cannon along the number line in steps in order to determine the correct answers in the untimed games.

PEDAGOGICAL CONTENT EVALUATION

The range, although limited, is quite sufficient for the objectives of the game. The intent is not to do long cumbersome arithmetic, but rather to apply integer operation rules quickly.

With the limited range, there is no sequence from easy to difficult. However, a student does have the choice of three operations and timed/untimed games. These choices make the game applicable for weak and strong students. The ability to work the answer out on the screen by making movements along the number line is another advantage.

Depth is satisfactory.

There are no user support materials but this is not a handicap as the game is simple and easy to learn. Questions are clear and the content is consistent with the grade 8 unit on integers.

INSTRUCTIONAL FORMAT DESCRIPTION

The instructional technique is a drill and practice game utilizing random questions within a specific range. Only one attempt per question is given. Positive feedback is achieved by awarding points and rank. If an answer is incorrect, the opponent become visible and destroys the correct number on the number line. Points also are deducted. Quantitative feedback is given when 5000 points have been accumulated.

INSTRUCTIONAL FORMAT EVALUATION

The student generally has good control of the program. (S)he can read/bypass directions, return to the directions or the menu at any time and control the rate by pressing return.

Feedback is generally good as multiple feedback methods are used (graphics, points counter, sound, etc.). However, there is no corrective feedback provided.

Within the limitations of a game format, the instructional format is good.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are used for the integer line, cannon, firing, bullet line, tokens, and the hidden force. Sound is used to designate a hit, a loss of points, or a misfire. The user can exit the program at any time and return to the menu.

TECHNICAL CHARACTERISTICS EVALUATION

Graphics, sound and color are used effectively. The use of the same three keys for input lends itself well to two students playing together and helping each other out.

Apart from the possible distraction of the sound reinforcements, the technical design of the game is good.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The program maintains a "player file" which keeps track of the scores and ranks that a user has achieved. New students are entered in the file upon entry; previous users have the option of resuming from the rank and score that (s)he last achieved or starting over.

There is no documentation.

IMPLEMENTATIONAL SUPPORT EVALUATION

The player file allows a student to continue an interrupted game and is an asset. Unfortunately, there is no indication of how many students may be maintained or how names can be deleted. The absence of documentation to the program is a liability.

SUMMATION

The major strength of this game is the fact that it is highly motivating and entertaining. Content range and sequence, while limited, are effective in achieving the objectives of the program. Although corrective feedback is not available, the instructional format of the game is satisfactory.

This game is effective in presenting drill on operations with integers in an interesting and motivating fashion. With judicious implementation by the teacher, this diskette will prove useful in a classroom setting for students of all abilities.

STATUS

"Laser Chaser" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $12.95 U.S. (1984) from Indian Head Software at the address given at the beginning of the report.

An unprotected copy may be purchased for $29.85 (U.S.). Schools may then make as many copies of the product as they wish so long as the copies are used only within the one site. Copies of the diskette may not be made and distributed throughout the school district.

Defective diskettes will be replaced without charge within a one year warranty period. After one year, the company will replace a diskette damaged for any reason for $5.00 U.S.

Alberta distributors include Alphatel Computer Products and Edupro Software. Contact these companies directly for their current prices and warranties (see page v. of the preface).

As the diskette is accessed at the end of each round (5000 points), it could be used in a number of computers at the same time but only one round could be played and it would have to be returned for entries into the player file; however, such use is subject to copyright laws and any license or purchase agreement.

MATH ACTIVITIES COURSEWARE 5

DESCRIPTION

Title: Mathematics Activities Courseware (MAC 5)
Author: Doug Super
Publisher: Houghton Mifflin Canada Ltd.
Source: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Subject: Mathematics
Topics: Rounding, estimation, whole number operations, fractions, decimals, area & perimeter, hours & minutes
Components: 3 disks & backups, teacher's guide, worksheets & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC, A French version is also available for the Apple.
Alberta Education Call No.: QA 107 H838 v5c 1983

Version: 1983
Display Language: English
Cost: $225.00 (1985)
Tel. #: (416) 475-1755
Users : Grade 5

OBJECTIVES

This courseware is designed to engage students in active experiences involving estimation, problem solving strategies, and concept development.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 5's three disks contain 15 games designed to provide drill and practice on the following topic areas:

1. ROCK-SCISSORS-PAPER: Rounding whole numbers to the nearest ten, hundred and thousand
2. ADD-GITATION: Estimating sums
3. PRODUCT TARGETS: 2 digit product estimation
4. TICKY-TACKY-TOE: Inverse relationship of division and multiplication
5. CENTIPEDE RACERS: Estimating area and perimeter in centimeters
6. TUG OF WAR: Estimating and refining quotients for 1 and 2 digit divison
7. FRACTION MAZE: Matching equivalent fractions
8. COORDINATES CORRAL: Naming coordinates, interpreting compass directions
9. THREE IN A ROW: Estimation of answers to multiplication of numbers with decimals
10. SAME SHAPE - SAME SIZE: Matching congruent figures using slides, flips, and turns
11. DECIMAL LADDERS: Comparing and ordering decimals from .001 to 9999
12. IT'S ABOUT TIME: Addition and subtraction involving hours and minutes
13. THE FUN FACTOR: Identifying common factors of two or three digit numbers
14. MIXED NUMBERS: Addition and subtraction of mixed numbers
15. FRACTION JIGSAW: Interpreting the area model of multiplication of mixed numbers.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

PEDAGOGICAL CONTENT EVALUATION

The content, sequence, and level of difficulty are appropriate to the grade 5 Alberta curriculum, although the program "Fraction Jig-Saw" may prove overly challenging. All program content is metricated.

Although the programs can support any authorized Grade 5 text provided that the suggested lead-up activities are employed, they are specifically designed to supplement the Houghton Mifflin Grade 5 mathematics textbook. When used in combination with classroom instruction and in conjunction with the support materials provided, this courseware fulfills its stated objectives admirably.

INSTRUCTIONAL FORMAT DESCRIPTION

Each game requires the student to demonstrate mastery of the skill mentioned in the objectives, to think of several possible answers to the randomized questions posed, and then to enter the answer that will be most likely to result in a successful turn. Feedback usually combines text, graphics and sound. Sequence of presentation is program controlled; rate is both user and program controlled.

INSTRUCTIONAL FORMAT EVALUATION

Interaction is consistent and readability is appropriate to a grade 5 audience. Game structure is both unique and imaginative. A few of the games are timed and this combined with a visible, ever-changing scoreboard serves to heighten both student motivation and interest. Students can compete with the computer or with other students and are encouraged to watch the responses of their opponent attentively in order to plan effective strategy for their next move. Feedback is immediate, non-threatening, and very motivational and encourages student interaction with one another. Although correct responses are almost always provided as part of the feedback, the problem solving process is unfortunately provided on only a few programs (e.g. Mixed Numbers). Students participate actively and can compete with other students or with the computer, thus heightening motivation. The disk does not provide operating instructions--this may frustrate initial users.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are an essential component of the programs. Color is used, but a color monitor is not mandatory. Sound can be teacher-disabled.

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is excellent. Displays are appropriate and effective, text is clear and easy to read, and transition from one display to the next is smooth. Optional sound complements each program. The use of both standard text size for general comments and large size text for important numbers or concepts adds effective emphasis. The program is well bomb-proofed in that all keys unnecessary to game operation are disabled.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 62 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strengths of this package lie in its close correlation with the Alberta grade five curriculum, the abundance of practice it provides in estimation and problem solving activities, and its effective use of graphics and sound to motivate students. Since the disks do not contain instructions on how to play the games, prior classroom preparation is essential. Also teachers will need to assist students having difficulty as only limited feedback is provided and some problem solving activities may prove to be challenging to weaker students.

STATUS

"Math Activities Courseware 5" has been designated as a **RECOMMENDED** learning resource.

PURCHASE INFORMATION

Alberta Schools may purchase this product from the School Book Branch for approximately $150 (1985). Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes. Diskettes which become inoperable through normal use may be returned to the S.B.B. and replaced for $28 (1985) approximately. There is no time limit for this warranty.

These diskettes have the advantage of being capable of operation with more than one machine at a time if only one activity is accessed; however such use is subject to copyright laws and any license or purchase agreement.

MATH ACTIVITIES COURSEWARE 6

DESCRIPTION

Title: Math Activities Courseware 6 (MAC 6)
Author: Doug Super
Publisher: Houghton Mifflin Canada Ltd.
Source: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Subject: Mathematics
Topics: Logic, metrics, estimation, operations with whole numbers, decimals and fractions
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC, a French version is also available for the Apple
Alberta Education Call No.: QA 107 H838 v6c 1983

Version: 1983
Display Language: English
Cost: $225 (1985)
Tel. #: (416) 475-1755
Users : Grade 6

OBJECTIVES

To develop and strengthen problem solving strategies, provide experience in estimation and concept development and to reinforce basic math skills.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 6 contains 15 programs designed in a game mode. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the Houghton Mifflin Mathematics textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

The topics of the games are as follows:

1. DECIMAL HUNT: A comparison of decimals involving searching methods and logical deduction
2. MASTER MATH: Reinforcement of inverse operations and basic skills in subtraction
3. MULTI-TARGETS: Estimation of answers for whole number multiplication
4. TUG-OF-WAR: Estimation of answers for whole number division
5. METRIC PATH: Estimation skills involving centimeters
6. NUMBER STUMPER: Relationships between common factors and common multiples
7. FRACTION DUET: Comparison of fractions and decimals
8. MULTI-MAZE: Determination of a decimal product and placement of the decimal
9. MAKING SENSE OF PERCENTS: Three estimation strategies for finding percents of whole numbers
10. FRACTION CHALLENGE: Multiplication and division of fractions with reduction
11. LEARNING THE ANGLES: Angular measurement
12. SLIDE-FLIP-TURN: Practice in sliding, flipping and turning geometric figures
13. SKETCH A PICTURE: Location of points and paths on a full coordinate plane
14. FRACTION HUNT: Estimation of sums and differences involving fractions
15. FRACTION SCALE: Interpretation of distances on a scale drawing.

User support materials consisting of worksheets and activities are provided for each game.

PEDAGOGICAL CONTENT EVALUATION

The content, sequence and level of difficulty are appropriate to the grade 6 Alberta curriculum with the exception of the programs involving fractions which would be more appropriate for enrichment. Also, the program "Sketch A Picture" is too challenging for most grade 6 students and instruction in locating points and paths on a full coordinate plane would have to be given prior to this program's use.

The courseware is not designed to stand alone but rather to be used with the Houghton Mifflin grade 6 math text and, as a supplement, it fulfills its objectives very well. In fact, the courseware would be useful with any authorized grade 6 textbook.

The user support materials are very good and can be used as extension activities or as parts of lessons leading up to the computer activities.

The content is current and metricated. The programs strengthen problem solving strategies, estimation and basic skills development in an interesting and appealing manner.

INSTRUCTIONAL FORMAT DESCRIPTION

Interaction with the computer consists of answer entry as well as menu selections and the designation of the number of players. Interaction within the group in discussing strategies can be productive and is encouraged.

Feedback techniques vary from one program to another but almost all are presented graphically with the use of sound. Examples of feedback include clues as to how close one is to the answer, an accuracy comparison of an estimation, elimination or addition of obstacles, awarding of points, ending of turns, etc. Graphical positive feedback motivates the student to get the answer correct.

INSTRUCTIONAL FORMAT EVALUATION

The instructional techniques used in these programs are appropriate for the target audience. They are effective and stimulating. Students participate actively and can compete with other students or with the computer.

The non-threatening and immediate feedback is very appropriate. Graphics, text and sound are all used to advantage. However, it should be noted that no help or explanation is given for incorrect answers. Students having difficulty with the concept or with the strategies involved may find certain games frustrating. As there are no explanations on how to play the games on the diskettes, students who are playing a game for the first time may also be frustrated.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are an essential component of the programs. Color is also used but a color monitor is not essential. Sound is optional and is controlled by the teacher.

TECHNICAL CHARACTERISTICS EVALUATION

The technical design of the programs has been done very well. The displays are appropriate, accurate and generally effective. The text is clear and easy to read. Generally, the transition from one display to another is very good.

Graphics, color and sound motivate the user. The program is easy to use and the user can readily leave the program.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 62 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strength of this package lies in its stress on the development of problem solving strategies, logical thinking and estimation. The game approach is very good as it keeps the user interested and motivated.

One weakness is the lack of instructions on how to play the games. This necessitates prior teacher instruction on how to use the programs. Also, some students will find the problem solving strategies difficult to master. Some of the games are quite challenging and the lack of corrective feedback/help could frustrate some users.

STATUS

"Math Activities Courseware 6" has been designated as a **RECOMMENDED** learning resource.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $150 (1985). Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes. Diskettes which become inoperable through normal use may be returned to the S.B.B. and replaced for approximately $28 (1985). There is no time limit for this warranty.

Each diskette has the advantage of being capable of operation with more than one machine at a time if only one activity is accessed; however such use is subject to copyright laws and any license or purchase agreement.

MATHEMATICS: LEVEL A (Managed)
MATHEMATICS: LEVEL B (Managed)
MATHEMATICS: LEVEL C (Managed)

DESCRIPTION

Title: Mathematics: Levels A, B and C (Managed versions)
Authors: Science Research Associates & WICAT Inc.
Publisher: Science Research Associates (Canada) Ltd.
Source: 707 Gordon Baker Road, Willowdale, Ontario, M2H 2S6
Subject: Mathematics
Topics: Fundamental operations with whole numbers, decimals and fractions
Components: 4 management diskettes, teacher's guide (59p.) and program diskettes (A = 4, B = 8 and C = 11)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, take out 80 col. board for print options.
Other Formats Available (not evaluated): Atari 800
Alberta Education Call No.: QA 135.5 S416m LA (LB & LC) 1981

Version: 1981
Display Language: English
Cost: $510,$695,$800 (1984)
Tel. #: (416) 497-7707
Users : Grades 1-6

OBJECTIVES

To provide drill and practice in major arithmetic skills for grades 1-6.

PEDAGOGICAL CONTENT DESCRIPTION

Topics in whole numbers (place value, counting, etc.), addition of whole numbers and subtraction of whole numbers are presented in Levels A, B and C. Multiplication of whole numbers, division of whole numbers and operations with fractions are included in Levels B and C. Operations with decimals are presented in Level C only. Level A is directed at the primary grades, Level B at middle elementary grades and Level C at upper elementary and junior high grades.

Each of the units is developmental and ranges from the introduction of a concept to the highest operation within that content area. Students progress through these levels based upon performance. A demonstration of mastery results in advancement while failure results either in a second attempt or in regression to easier levels.

Assistance is available to the user through a "help" mode which leads the student through the algorithm.

PEDAGOGICAL CONTENT EVALUATION

As a drill and practice package, the managed version is excellent. The scope and sequence are well planned. The flexibility and range of the difficulty levels are superb and the "help" mode provides the student with excellent assistance. Students are guided through the "help" sessions in very clear, well defined steps supported by good graphics. This is a most suitable program for students from grades 1 through 7.

INSTRUCTIONAL FORMAT DESCRIPTION

The student can input answers in parts (algorithmically) or in their entirety. The student also has the choice of requesting help during which (s)he is kept active in entering responses.

Feedback consists of happy faces or X's in boxes at the bottom of the screen. The boxes also indicate the number of questions in the drill. An "OK" and an optional audio "beep" also appear with correct responses, while a "NO" appears with errors. Quantitative results and a recommendation on future work appear at the end of each drill.

Evaluation in the "progress" mode is embedded. However, an option available to the teacher is the use of the "practice mode" as a test. A "placement mode" is available to determine at which level a student should begin his/her work on each operation.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design of this package is sound. Interaction with students is effective and the feedback is consistent, relevant and immediate; however, students are given only one chance at responding to a question. This can be a drawback especially since the entry of answers is not always right to left. The opportunity of using the practice mode as a test gives the teacher an excellent opportunity to quiz the student on any lesson. The options available to the student are excellent and, if used, can quickly improve skill levels. The flexibility in the control of the program, particularly of the scope and sequence, can give the teacher complete control of what the students will practice.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are generated in large size, high resolution graphics. An audio "beep" is optional.

TECHNICAL CHARACTERISTICS EVALUATION

The package is well designed. Numbers and letters are large and easy to use and the program moves along at an adequate pace. Although the programs are generally friendly, reliable and consistent, some instruction to students is required regarding the special function of some keys.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Management system options available to the teacher include:

1. Edit user records, e.g. add, delete or list users, lock/unlock lessons.
2. Edit curriculum options, e.g. add, delete units.
3. Edit teacher options, e.g. change passwords, audio feedback.
4. Print reports: five reports are available on the screen or in hard copy. These are: individual student reports, class list reports, graphic class reports (progress of the class within a unit), student positive report (% of lessons completed, comparison to class average), and unit enrollment reports (names of students in a unit).
5. Print seatwork: up to 99 exercises can be generated on the printer.

Options available to the student include:

A. Placement mode: a pre-test for a student entering a content area for the first time which will determine the beginning lesson.

B. Progress mode: practice with automatic progress. A score of 80% or more on a drill moves the student to the next drill. Scores of 50%-79% result in repetition of the drill. A failing mark (less than 50%) requires the drill to be repeated and a second failure results in regression to a previous lesson.

C. Practice mode: The work is recorded but the student's standing is not affected as in the progress mode.

A maximum of 150 students may be entered (50 per data diskette). Users are listed alphabetically on each diskette. Note that the print options do not work with the Apple IIe if the 80 column board is in place.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management package, although complex, is user friendly and would require about one hour to learn. It performs well and provides accurate and detailed records of student performances at all times.

The need to frequently exchange diskettes could be overcome if a dual drive version was available. The retrieval of student records is slow and this becomes worse as more students and more student scores are entered on a data diskette. As the loading and recording waits can become significant, many student data diskettes would be needed for effective use in a classroom.

SUMMATION

Apart from some problems in diskette handling with the management system, the overall package is excellent. Diskettes will vary slightly in quality and some teachers may find the approach used to practice a particular skill is less than what they would have desired. However, the overall quality of the three levels is excellent, particularly in the scope and sequence of the content and the help available to the student who makes an error. The package is expensive but it should be measured against the number of objectives covered and the number of diskettes in the package.

STATUS

"Mathematics Levels A, B and C" have been designated as **RECOMMENDED** learning resources.

PURCHASE INFORMATION

Alberta schools may purchase the products from the School Book Branch at the following approximate prices (1984): Level A - $400; Level B - $550; Level C - $625

Diskettes may be purchased individually at the following approximate prices (1984): Level A - $75; Level B - $70; Level C - $65

Defective diskettes will be replaced without charge within a 90 day warranty period. Diskettes which become inoperable through normal use may be replaced for approximately $8. There is no time limit for this warranty.

As diskette access is frequent, use of a diskette is limited to one computer at a time.

MATH SEQUENCES

DESCRIPTION

Title: Math Sequences
Authors: Educational Software Systems
Publisher: Milliken Publishing Company
Source: 1100 Research Blvd. St. Louis, Missouri 63132
Subject: Mathematics
Topics: Whole numbers, fractions, decimals, integers, percents, number readiness, equations & measurement formulae
Components: 12 diskettes, teacher guide (55p.), four duplication masters
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore Pet, Atari 800, TRS 80 Level II
Alberta Education Call No.: QA 139 M654m 1980

Version: 1983
Display Language: English
Cost: $550 (1984)
Tel. #: (314) 991-4220
Users : Grades 1 - 8

OBJECTIVES

To provide drill and practice in arithmetic skills introduced in grades 1-8.

PEDAGOGICAL CONTENT DESCRIPTION

The package consists of 12 diskettes, one on each of the following: number readiness, whole number addition, subtraction, multiplication and division, laws of arithmetic, integers, fractions, decimals, percents, equations and measurement formulae. Each skill area is divided into a number of small problem levels that gradually increase in difficulty. Students progress through these levels based on performance. A demonstration of mastery results in advancement while failure results in regression to easier levels. The teacher has control over these and other parameters through the management system.

PEDAGOGICAL CONTENT EVALUATION

On the whole, the range of the content is appropriate and effective. The sequencing of the content is excellently done with small increments and a very orderly progression from one level to the next. It should be noted that these are drill exercises and no instruction in the skill/concept is provided.

Minor problems are the incorrect use of metric symbols and some improper decimal notation (e.g. .25 instead of 0.25). These weaknesses are not extensive.

INSTRUCTIONAL FORMAT DESCRIPTION

The bulk of the user's interaction with the program is through entry of numerical answers which are evaluated upon entry. In addition, the user may request help with renaming, may change quotient answers and may escape from the program early.

Feedback is provided in either textual or graphical mode as specified by the teacher. There is a variety of positive feedback messages, each of which lasts approximately three seconds before erasure is possible. Negative feedback occurs after the second error in a problem and consists of a flashing text statement followed by a demonstration of the solution. Quantitative feedback is provided through a series of letters and numbers at the bottom of each page and through narrative statements at the end of the drill.

Evaluation is done through embedded tests. The number of questions to be done and the mastery and failure levels can be specified by the teacher through the management system. A question is considered wrong on the second attempt. If only one error is made, the question is recorded as correct.

Students progress through the sequence of skills linearly. If they meet the criteria, the management system advances them to the next skill. They will automatically be dropped to an easier level if failure is met.

INSTRUCTIONAL FORMAT EVALUATION

There are a number of instructional format weaknesses:

1. The negative feedback shows the user how the correct answer is obtained but does not involve him/her in that lesson.
2. Positive reinforcement screens might be considered to be boring and time consuming.
3. Pre-tests and post-tests are not included. As a result, a student may not be placed at an appropriate level. Generally speaking, the better student's needs are not considered and this student may find the drills boring.
4. Younger students may find the quantitative feedback coding to be confusing.
5. It may be considered inappropriate to allow a student who makes a mistake on each question to end up with the same score as a student who makes no errors.

6. The use of multiple choice questions (Measurement Formulae) allows the student to guess answers.
7. If a student hits two keys by accident, (s)he has no chance to correct the input.

Notwithstanding the above criticisms, the overall instructional format is satisfactory. While there is room for improvement, the package can be used effectively within a classroom setting.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are used in large size numbers, mathematical symbols and positive reinforcement.

TECHNICAL CHARACTERISTICS EVALUATION

The positive reinforcement graphics may be inappropriate and time consuming, particularly for older students. However, the teacher may elect to use text statements.

In the "Number Readiness" diskette, the graphics are slow in appearing and may be confusing because of the way they are printed on the screen.

In the "Equations" diskette, the fact that the equations are printed opposite to the way that they are read may be confusing and delaying.

Generally, graphics and display designs are appropriate and effective. The technical quality may be considered to be very good.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Initialization, student management & class management functions are available in a management system. These include: making individual or class assignments, specifying mastery/failure levels and the number of questions and reviewing class/student progress. Also, there are functions to add, list, delete students, etc. The management system resides on each diskette and has a capacity of five classes per diskette to a maximum of 100 students.

The teacher's guide contains scope and sequence charts, operating procedures, management system description, instructions on use, problem level examples and duplicating masters.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system allows a teacher to specify a wide variety of student assignments and to receive a good deal of information about the student(s). The teacher using this system should be prepared to read the manual carefully and attempt some trial entries before full use. There is some confusion in making inputs, viewing the graphic results and making lists. List making is slow. A revised manual would be advantageous.

Another weakness inherent in the design is the fact the management system is on each diskette. While this saves time in entering class scores, it does take extra time in entering class lists on each diskette and in viewing the results of students who may be practicing a variety of skills at the same time.

SUMMATION

For the amount of content covered and the price, the Milliken Math Sequences should be highly considered. While there are some weaknesses, these are minor compared to the positive benefits which are provided, particularly in the sequencing and the range of the content. Teachers who are prepared to spend the time to learn the management system and to become familiar with the content sequence will find that the package will be effective.

STATUS

The package "Math Sequences" has been designated as a **RECOMMENDED** learning resource.

PURCHASE INFORMATION

Alberta schools may purchase this product from the School Book Branch for approximately $320 (1984). Diskettes may be purchased individually for approximately $50. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced, within 13 months, for approximately $14 each.

As diskette access is frequent, diskettes in this package may be used with only one computer at a time.

NOTE

During the 1984/85 school year, a number of Alberta schools reported that disks in this series had a tendancy to fail suddenly. As a result, not only were the programs lost but so were all student records. This problem was drawn to the attention of Milliken Publishing Company which reported that they are preparing revisions which will allow backups of management data (along with other enhancements). In the meantime, Milliken advises schools to try "faulty" disks on other disk drives as the fault is often with the drive speed and not the diskette. As the diskette has a lot of information stored on it, it may be necessary for drive speeds to be corrected in order to read Milliken disks.

MEASUREMENT

DESCRIPTION

Title: Measurement
Series: Mathematics for Science
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 27 Armstrong Ave., Georgetown, Ontario L7G 4X6
Subjects: Mathematics, science
Topics: Scale reading, linear scales and vernier scales
Components: 1 diskette and backup, manual (12p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Commodore PET
Alberta Education Call No.: QA 43 M174 1982

Version: 1982
Display Language: English
Cost: $72.00 (1985)
Tel. #: (416) 877-0171
Users : Junior/Senior High

OBJECTIVES

To read a simple scale, various linear scales, or a vernier scale and to record the reading using the correct number of digits.

PEDAGOGICAL CONTENT DESCRIPTION

This diskette contains three programs, each containing two independent lesson and drill sections which are user selected from a menu:

1. SCALE READING - The lesson portion of this program presents a vertical linear scale in centimeters (0 - 17). A vertical column is depicted next to the scale and the user is asked to estimate its length. Three consecutive correct answers end the lesson. Incorrect answers receive a corrective message together with the correct length being depicted on the scale. The drill segment consists of 10 questions in which the user is requested to estimate the height of a column correct to one decimal place.

2. LINEAR SCALE - The lesson portion contains a 5 question pre-test followed by explanation and examples which lead the user through a four-step process for estimating values from a scale: 1) determine the value represented by a single scale division; 2) determine the reading represented by the scale line immediately below the measurement; 3) determine the distance from the first estimate to the position being measured; and 4) add the first estimate to the increment. The drill consists of 10 questions in which the student reads a variety of scales with a leeway of one digit allowed on the last digit.

3. VERNIER SCALES- The lesson begins by defining a vernier scale, and with the aid of an animated vernier caliper develops the meaning of fixed and sliding scales. An example is presented where the user needs to read the scale to one decimal place. With a correct answer the user is given the option of learning to read a caliper to two decimal places. The option of reading a caliper from right to left is then presented.

A drill consists of 10 questions in which the user is required to read the vernier scale in one of three difficulty levels: 1) to one decimal place; 2) to one and two decimal places; and 3) to one and two decimal places using reverse order scales.

PEDAGOGICAL CONTENT EVALUATION

"Scale Reading" offers little explanation on the degree of precision required or how to estimate intermediate subdivisions until an error is made. This allows the user to proceed more quickly through the program, but it may cause confusion for weaker students. Depth of presentation is appropriately dependent upon the user's success rate.

Range, sequence and depth are all appropriate in the the remaining two programs. "Vernier Scale" offers a very complete explanation, and both programs use graphics effectively to add clarity to examples.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of choosing a lesson or drill from a menu, using the space bar for page turning, or entering numerical inputs. Questions in both the lesson and the drill sections are randomly generated with immediate feedback provided after each problem and a cummulative score kept throughout the drill. A correct answer results in one of a variety of positive phrases being displayed; an incorrect answer results in graphics and text being used to explain the correct answer. Errors in format are distinguished from errors in estimation.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is generally appropriate to the target audience, and reviews presented at the end of lessons provide effective capsulizations of content. Drill questions are well designed to test student understanding of the concept(s) presented in the lesson, and corrective feedback effectively differentiates between format errors or estimation errors. Additional instructional explanation in "Scale Reading" would be desirable. One may question the desirability of allowing students to select the amount and variety of examples that (s)he is exposed to in the program "Linear Scale".

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in combination upper/lower case with hi-res graphics used to depict scales. Sound is provided optionally as feedback to answer responses. Color is used for the graphics and to highlight sections of the text.

TECHNICAL CHARACTERISTICS EVALUATION

Graphic displays are instructionally effective, particularly in the use and movement of the vernier scale. Text displays are well-organized and readable and make good use of selective scrolling. Sound is appropriately user controlled. The program is bombproof and traps invalid inputs.

SUMMATION

Effective use of graphics, well-designed corrective feedback, concise content reviews and active student interaction make "Measurement" an effective classroom instructional tool. Further explanation of correct precision rules would add clarity to all programs.

STATUS

"Measurement" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $72.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire "Math for Science" series is available for $217.00. It consists of four individual packages each of which has been given a supplementary status ("Measurement", "Basic Math Techniques", "Exponential Notation" and "Miscellaneous").

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for pricing and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

MISCELLANEOUS

DESCRIPTION

Title: Miscellaneous
Series: Mathematics for Science
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 27 Armstrong Ave., Georgetown, Ontario, L7G 4X6
Subjects: Mathematics; science
Topics: Metric conversion, slopes of linear graphs
Components: 1 diskette and backup, manual (12p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Commodore PET
Alberta Education Call No.: QA 43 M174 1982

Version: 1982
Display Language: English
Cost: $51.00 (1985)
Tel. #: (416) 877-0171
Users : Junior/Senior High

OBJECTIVES

Learners will be able:

1. To convert a metric quantity to an equivalent metric quantity using a different metric prefix.
2. To calculate the slope of a straight line.

PEDAGOGICAL CONTENT DESCRIPTION

This diskette contains two programs, each containing two independent lesson and drill sections which are user selected from a menu:

METRIC - The program begins with a review of metric prefixes (mega, kilo, hecto, deca, deci, centi, milli, and micro) and then presents a "metric staircase" (a visual presentation of metric prefixes than can be used to help make metric conversions.) Using randomly generated examples complete with detailed feedback, the student is shown how to use the metric staircase to make conversions.

SLOPE - This program begins by examining a linear distance/time graph and uses it to explain the meaning of "rise" and "run". The technique of finding slope, rise and run are elaborated via student responses to questions posed about displayed graphs. The lesson concludes with a review of concepts learned.

Each program is followed by a 10 question, cummulatively scored drill on the concepts presented in the program. (1 mark is given for a correct answer, 0.5 for a correct answer containing a format error, 0 for an incorrect answer.)

PEDAGOGICAL CONTENT EVALUATION

This diskette effectively meets its objectives. Range and sequence are satisfactory for the target audience and appropriate depth is generally achieved since program routing is dependent upon student success. The method used for metric conversion is an excellent mnemonic device, however it may not fit into the overall curricular scheme of some teachers, particularly if they are trying to emphasize the factor label method in preparation for other types of calculations which make use of that scheme.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of choosing a lesson or drill from a menu, using the space bar for page turning and entering numerical inputs. Lessons utilize randomly generated questions sequenced to fit pre-determined problem types to lead a student through a step-by-step understanding of the concept being taught. Depth is usually dependent upon the student's success rate. Questions in the drill sections are randomly generated with immediate feedback provided after each problem and a cummulative score kept throughout the drill. A correct answer results in one of a variety of positive phrases being displayed; an incorrect answer results in a series of hints to guide the user to the correct answer.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is generally appropriate to the target audience, and graphics are effectively used to reinforce learning. One may question the wisdom of allowing students the choice of whether they wish to do more examples after they solve one question in each metric problem type correctly, for: 1) Weaker students who would need this practice most may not avail themselves of the opportunity, and 2) Obtaining one correct answer could be achieved accidentally rather than as a result of mastery of the concept. Randomized drill questions effectively test student understanding of the concept(s) presented in the lesson, and the hints provided in the corrective feedback lead a student to analyze errors and so encourage corrective learning. Student interaction is meaningful and consistent. The addition of instructions regarding which format to use and what constitutes a format error would be helpful.

The "Slope" program has a sharp increase in the level of difficulty between the lesson and drill sections which may pose a difficulty for some students. (E.g. The drill questions introduce many vertical and horizontal lines other than the key ones illustrated in the lesson, thus the questions are much harder to solve.)

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in combination upper/lower case and high resolution graphics are used to depict the metric staircase. Color, flashing and underlining are used to highlight certain parts of the text. Aural feedback is available at the start of each program segment.

TECHNICAL CHARACTERISTICS EVALUATION

Text displays are well-organized and readable and make good use of selective scrolling to keep important material on the screen. Sound is appropriately user controlled. The program is bombproof and traps invalid inputs. Some timing loops in the lessons are too slow (e.g. In the "Metric" program, many of the loops used to present information are too long--this becomes particularly annoying if you are routed through the lesson again). Also there are some minor spelling errors.

SUMMATION

Well-designed graphics, good content sequencing and effective corrective feedback combine to make this diskette a useful classroom teaching aid.

STATUS

"Miscellaneous" has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This product may be purchased for $51.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire "Math for Science" series is available for $217.00. It consists of four individual packages each of which has been given a supplementary status ("Measurement", "Basic Math Techniques", "Exponential Notation" and "Miscellaneous").

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for pricing and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

MULTIPLYING FRACTIONS

DESCRIPTION

Title: Multiplying Fractions
Author: Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Avenue, Port Chester, New York 10573
Subject: Mathematics
Topics: Multiplication of common & improper fractions involving cancellation
Components: 1 diskette, guide (2p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari, IBM
Alberta Education Call No.: QA 117 M961 198-

Version: 1982
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 5-8

OBJECTIVES

To give students in grades 5-8 drill and practice in multiplying fractions.

To facilitate the understanding of the cancelling or reducing process in order to simplify the problem.

PEDAGOGICAL CONTENT DESCRIPTION

The program provides drill and practice on the procedures for multiplying two fractions where cancellation may or may not be possible.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. These instructions deal with running the program and do not involve explanations on the concepts involved. One example is provided.

Following the instructions, the user is given random multiplication problems. In order to solve the question, the user must decide whether to cancel/reduce or multiply. Upon inputting the correct operation, (s)he must then perform the operation. The computer modifies the question appropriately and then resumes the solution process. If possible, final answers are to be converted to mixed numbers.

The user decides at the end of each problem whether another question is to be posed.

PEDAGOGICAL CONTENT EVALUATION

The instructions are intended to demonstrate how to use the program. Their lack of depth and clarity would be inadequate to teach the concept to a student who has not had prior instruction.

The range and sequence of the content are very limited in that only one small skill is addressed and there is no development of sequence within that objective. While that one operation has been covered well, the value of the diskette would be greater with a wider range. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength of the program.

In Alberta the content is not particularly applicable to the designated target audience (grades 5-8) as this objective is no longer included in the grade 5, 6 or 7 curriculum. It may be applicable to grade 8 students.

The program is remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

Correct answers result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of numbers result in a brief remedial statement. These statements may direct the user to the correct operation or may show a numerical calculation. The correct answer must be entered before the user can proceed.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors. At the end of the drill, similar quantitative feedback is available for all the questions attempted.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

Quantitative feedback, while available, does not provide the teacher with specific areas of difficulty. Also some mention of the total number of questions attempted should be included.

Another weakness is the lack of an evaluation component (pre-test/post test) and the lack of different levels of difficulty. These would provide more flexibility in dealing with students with varying abilities.

In general, the instructional format of this drill is good.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into three areas: original problem, work space and messages. As the question is solved, the work space is modified but the original question remains untouched. The messages area provides instructions and information to the user.

The inverse mode is used to highlight important pieces of information.

TECHNICAL CHARACTERISTICS EVALUATION

The screen has been well formatted. The use of the three parts allows necessary information to be retained, transformations to be shown clearly and messages to be clearly and efficiently shown to the user.

The technical design of the program is good.

SUMMATION

This program meets its specific objective very well. Content depth, feedback techniques and technical design are all very good. The diskette is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remediation.

The limited content range is a disadvantage and the structured approach may be boring to students who have the necessary skills. Also the quantitative feedback could provide more information to the teacher. These weaknesses are minor when compared to the overall quality of the program.

STATUS

"Multiplying Fractions" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S (1984) from Microcomputer Workshops at the address given at the beginning of the report. A backup may be purchased for an additional $5.00 U.S. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, the package may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

The diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

SOLVING QUADRATIC EQUATIONS

DESCRIPTION

Title: Solving Quadratic Equations
Author: Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Avenue, Port Chester, New York 10573
Subject: Mathematics
Topics: Solving quadratic equations by factoring
Components: 1 diskette & backup, guide (3p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor.
IBM PC family, 64K, monochrome monitor
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari
Alberta Education Call No.: QA 215 Q1 198-

Version: 1982
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 9-12

OBJECTIVES

To give students in grades 9-12 drill and practice in solving quadratic equations by factoring.

To facilitate the understanding of the factoring process and of setting each factor equal to zero and solving as a separate equation.

PEDAGOGICAL CONTENT DESCRIPTION

The program provides drill and practice on the procedures for solving quadratic equations where the coefficient of the squared term is 1, 2 or 3.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. Following the instructions, the user is given random equations at one of two difficulty levels (A = 1; A = 2 or 3). In order to solve the problem, the user must select from a list of operations (divide both sides by a number, factor the left side, set each factor = 0 and solve). Upon inputting the correct operation, (s)he must then perform the operation with procedural assistance from the program. The computer modifies the equation appropriately and then resumes the solution process.

The user selects the number of questions (1-9) to be posed.

PEDAGOGICAL CONTENT EVALUATION

The instructions are intended to demonstrate how to use the program. Their lack of depth and clarity would be inadequate to teach the concept to a student who has not had prior instruction.

The range and sequence of the content are somewhat limited in that all coefficients are integers. However, two levels of difficulty are available and a well-designed tutorial on factoring is given to a student who is unsuccessful in two attempts. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength to the program.

The program is basically remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

Correct answers result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of terms result in a brief remedial statement. These statements may direct the user to the correct operation or may show a correct simplification. The correct answer must be entered before the user can proceed. If the user is unsuccessful in two attempts at factoring the equation, (s)he is sent to a tutorial where instruction in factoring is given.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors. Similar quantitative feedback is given at the end of the drill.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best used for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

The remedial branch on factoring adds an important dimension to the program. While this branch would not be successful for a student without prior instruction in factoring, it will provide assistance to those students who have a basic understanding of the process but need additional help.

The number of random questions generated seems to be rather restricted. Some students may have questions repeated.

In general, the instructional format of this drill is good.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into three areas: original problem, work area and messages. As the question is solved, the work space is modified but the original question remains untouched. The messages area provides instruction and information to the user.

The inverse mode is used to highlight important pieces of information.

TECHNICAL CHARACTERISTICS EVALUATION

The screen has been well formatted. The use of the three parts allows necessary information to be retained, transformations to be shown clearly and messages to be clearly and efficiently shown to the user.

The technical design of the program is satisfactory.

SUMMATION

This program meets its specific objective very well. Content depth and feedback techniques are both very good. The diskette is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remedial students.

The structured approach may be boring to students who have the necessary skills. Also the quantitative feedback could provide more information to the teacher.

These weaknesses are minor when compared to the overall quality of the program. This is a good program for remediation.

APPLE - IBM VERSIONS

This report is based on the evaluation of the Apple product. In reviewing the IBM version, no significant differences were found.

STATUS

The Apple and IBM versions of "Solving Quadratic Equations" have been designated as **SUPPLEMENTARY** learning resources.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (Apple, 1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

WHOLE NUMBERS

DESCRIPTION

Title: Whole Numbers
Authors: Courses by Computers, Inc
Publisher: Sterling Swift Publishing Company
Source: 7901 South IH-35, Austin, Texas, 78744
Subject: Mathematics
Topics: Addition, subtraction, multiplication and division of whole numbers
Components: 6 diskettes, teacher's guide (72p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, printer & game paddles optional
Other Formats Available (not evaluated): Available in Apple format only
Alberta Education Call No.: QA 107 E28m 1981

Version: 1981
Display Language: English
Cost: $495 U.S. (1984)
Tel. #: (512) 282-6840
Users : Grades 1-9

OBJECTIVES

To provide drill and practice (with some tutorial instruction) in operations with whole numbers.

PEDAGOGICAL CONTENT DESCRIPTION

Addition, subtraction, multiplication and division programs are presented on four different diskettes. In each operation the user moves from the presentation of very basic number facts to questions which require regrouping concepts. Each strand is divided into five or six lessons with an introductory tutorial explaining how to do the type of question, then a set of problems, a choice of doing more questions and then a test.

Another program diskette contains two games. In "Slam Dunk" the student attempts to answer as many questions within 30 seconds as possible. The user may choose mixed questions or questions on any one of the four operations. "Space War" is a competition between two students using game paddles with each attempting to be the first to enter three correct answers to more difficult addition or subtraction questions.

PEDAGOGICAL CONTENT EVALUATION

The content covers a limited portion of the elementary program in Alberta and is really only appropriate for grades 4 and 5. All materials however are clearly stated and logically sequenced.

The depth of the drills is good as students may choose to receive more practice questions. In the tutorials, there are one or two examples per lesson, each of which is worked through step-by-step. This will likely be insufficient if the student has not been previously introduced to the concept. An option of receiving more examples or skipping the tutorial would be advantageous.

The content of the games is appropriate to the objectives and to the target audience. The programs are intended only to provide speed drills on basic number facts and they do this adequately. However, there is nothing in between the easy questions of "Slam Dunk" and the hard questions of "Space War".

INSTRUCTIONAL FORMAT DESCRIPTION

During the drill and test sections, the student inputs numerical answers and presses the return key. Regrouping, borrowing and cursor placement are all controlled automatically by the program and the user has no interaction in these stages. In more complex problems, the student may enter one digit at a time in response to specific instructions. Interaction during the tutorial section consists of pressing return.

The student receives immediate feedback after each response. Correct answers receive randomly selected positive reinforcements. The first incorrect response in a drill question results in a hint which is tutorial in nature and is usually directed at the first step needed to calculate the answer. If an error is made again, the student is shown how to do the question and is given the answer. An error in a game results in either provision of the correct answer (Slam Dunk) or repetition of part of the question (Space War). Quantitative feedback is given after tests, at the end of each drill/game and at the beginning and end of each diskette.

Pre-tests and post-tests have timed and untimed sections. The pre-test determines at which lesson the student should begin and the post-test determines if mastery has been met. The student is informed how many questions (s)he will be shown and what the mastery level is. It is possible to get a mark on the pre-test which allows the user to skip the diskette completely or to select any lesson for review purposes. Students who have completed the lessons may also use the programs for review.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drills is generally satisfactory. It would have been better to require the user to regroup the numbers and to control the cursor in multiplication and division questions. Interaction during the tutorial is somewhat weak as the user is limited to pressing the return key.

Both positive and negative feedback are handled well. The method of giving hints and showing the student how to do it on the second error is a good feature. The quantitative feedback is also good. The user knows how well (s)he is doing at all times.

The use of pre-tests and post-tests is excellent. These are probably the finest features of the programs.

The instructional format of the games is adequate. "Slam Dunk" is not really a game, it is a drill with graphical feedback. There is no strategy of winning involved other than to enter the answer as quickly as possible. "Space War" has competition but the emphasis is solely on speed and not on any other kind of strategy.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are used for most of the presentation while sound signals that the return key must be pressed. An animated figure and/or direction arrows focus the user's attention to appropriate parts of the display.

TECHNICAL CHARACTERISTICS EVALUATION

The small figure used as a prompt, pointer and positive reinforcement is entertaining and functional without being distracting. The additional graphics used to focus attention may be a bit confusing since the screen can become crowded with arrows, explanations and very small digits.

The sound may be distracting in the classroom. Also, use of the reset key will crash the program. Otherwise, the technical quality is satisfactory.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teachers may enter, modify or delete class lists as well as update or display student records. Information available includes student names, numbers, passwords, prescriptions, individual records and small group reports. Apart from the individual records, all of the other reports are available only on a printer.

Results are stored on program diskettes which have to be updated onto the management diskette. Five classes with a maximum of 40 students each may be stored.

The teacher may use the management system to override the program's control of the student's sequence; however, this is not recommended by the publisher.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management of the records is adequate. While comprehensive records for all students may be kept, students must be registered on all disks and only a profile of achievement is displayed showing the number of times it takes a user to successfully complete a lesson. Student scores are not kept. Also, the teacher must remember to update this file regularly. The system is somewhat confusing to learn. It has satisfactory features on the registration and manipulation of student lists but it provides only limited information on results.

The sparse documentation on accessing the display data does not make it clear that only hard copy reports are available.

There may be some difficulties encountered when changes are made to the master diskette if one of the program diskettes is subsequently not accepted. It would be preferable to update the master diskette only after additions or deletions have been made to the four program diskettes.

SUMMATION

The availability of pre-tests and post-tests and the quality of the feedback are strong features; however, the materials are expensive considering the limited number of grade levels in which they could be used in Alberta.

STATUS

"Whole Numbers" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

The product may be purchased for $495.00 U.S. (Oct. 1983) from Sterling Swift Publishing Company at the address given at the beginning of the report. Subsequent sets purchased by the same account are $295.00 U.S. Defective diskettes will be replaced without charge within a 90 day warranty period. Damaged diskettes may be replaced for $9.95 U.S. with proof of purchase. There is no time limit for this warranty.

In Alberta, the package may be purchased from Edupro Software (see page v. of the preface). Contact the company directly price and warranty information.

As the programs are controlled by a management system, diskettes in this package may be used with only one computer at a time.

ALGEBRA DRILL & PRACTICE I

DESCRIPTION

Title: Algebra Drill & Practice I
Authors: R. Detmer & C. Smullen
Publisher: Conduit
Source: University of Iowa, Oakdale Campus, Iowa City, IA 52242
Subject: Mathematics
Topics: Fractions, percents, integers, word problems, simplification, slopes and equations of lines
Components: 2 disks, teacher's guide (39p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Display Language: English
Cost: $125.00 U.S. (1984)
Tel. #: (319) 353-5789
Users : Grade 9 +

OBJECTIVES

The student should be able to:

1. Add, subtract, multiply, divide and reduce algebraic and numeric fractions.
2. Perform addition, subtraction, multiplication and division of one and two digit integers and apply the rules of order of operations to signed numbers.
3. Simplify first degree algebraic expressions using the distributive property and the collection of like terms.
4. Solve problems dealing with:
   a) Distance (using $d = rt$ with two body motion)
   b) Perimeter of rectangles (given perimeter and the relationship between length and width)
   c) Dilutions (mixing solutions given concentrations and volumes)
5. Find the slope of a line given:
   a) two points on the line
   b) given its equations ($Ax + By + C = 0$)
6. Find the equation $Ax + By + C = 0$ given:
   a) its slope and a point on the line
   b) two points on the line
7. Find a percent of a given number, find what percent one number is of another, determine what percentage a change of price is and determine a new price after a percent change.

PEDAGOGICAL CONTENT DESCRIPTION

Each of the nine programs included in this package is intended to provide a supplementary teaching aid for a specific topic in elementary algebra.

ALGEBRAIC FRACTIONS - provides drill and practice with addition, subtraction, multiplication, division and reduction of algebraic fractions.

NUMERIC FRACTIONS - provides drill and practice with addition, subtraction, multiplication, division, and reduction of numeric fractions.

SLOPES & EQUATIONS OF LINES - presents four types of problems involving slopes or equations of lines:

1. The slope of the line through points such as (-2,4) and (3,-5)
2. The slope of the line with an equation such as $6x + 4y - 8 = 0$
3. The equation of the line given the point and slope, e.g. (2,-4) and $m = 3/2$
4. The equation of the line through the two points such as (3,-2) and (-3,5)

PERCENTAGES - presents the following four sample types of problems involving percentages:

1. 15% of 120
2. 80 is what percent of 200
3. The price of an item is \$8. If the price is increased to \$10.40, what is the percent of increase?
4. The price of an item is \$16. If the price is decreased by 12%, what is the new price?

SIGNED NUMBERS - covers eight types of problems involving signed numbers and order of arithmetic operation in the format of: $3 + (-4) = ?$, $2 - 3(-5) = ?$, $-2(-1 + 5) = ?$, $-2 + 6/2 = ?$, $-7(-8) = ?$, $-5(-2) - (-3)(6) = ?$, $9/(-3) = ?$, and $(8 + 6) /(-2) = ?$.

SIMPLIFYING EXPRESSIONS - provides drill and practice with simplifying algebraic expressions, including addition, subtraction, and use of the distributive property. Questions revolve around one of four problem types: $-3X + 5X = ?$, $(2A - 3B) - (-A + 4B) = ?$, $-2 (-2S - 3T + 5) = ?$, and $4 (X - 2Y + 3) - 3(X + 3Y - 2) = ?$.

WORD PROBLEMS: DISTANCES - provides practice at four difficulty levels in setting up and solving word problems involving the formula d = rt.

WORD PROBLEMS: RECTANGLES - provides drill in setting up and solving word problems involving lengths, widths, and perimeters of rectangles.

WORD PROBLEMS: MIXING SOLUTIONS - provides practice at four difficulty levels in setting up and solving word problems involving mixing solutions of different strengths.

All programs begin by presenting sample questions which can be again accessed if a question is answered incorrectly. Questions continue to be generated until the student has answered 5 - 20 correctly on the first or second attempts. All answers are expected to be in proper mathematical form, although alternative forms are accepted if correct. For example, fractions are expected to be in lowest terms; however, unreduced answers are accepted.

PEDAGOGICAL CONTENT EVALUATION

The content of these disks is appropriate for the target audience. Content is clearly presented and the user has total control of sequence. Depth of presentation is sufficient to meet the program intents but it lacks variety in the types of solutions used. Unfortunately the distance program does not use metric measurements.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, opting/bypassing examples by entering Y/N, paging through examples by hitting RETURN, and entering answers using the entire alphabetic, numeric and symbolic keyboard. Problems are randomly generated from a data bank. Students are given two attempts at each question. After one incorrect answer the message "That's wrong. Try again" is displayed. A second incorrect answer results in the message" That's still wrong" followed by a display of the solution worked out in detail as per the example.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate to the target audience. Random generation of questions provides good variety and allows the program to be used repeatedly; however, incorrectly answered questions unfortunately are not reposed later in the sequence. Feedback is immediate and non-threatening and effectively distinguishes between a wrong answer and the wrong format. The user has complete control of sequence, rate and amount. Messages presented thoughout the drill sequence indicating that the student has reached the half way point or that only a few problems remain to be answered add motivation.

The absence of any form of pre-test or post-test is an instructional design weaknesss.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color is used in information and feedback displays. A high resolution character set presents upper and lower case text in standard size.

TECHNICAL CHARACTERISTICS EVALUATION

Character size is appropriate, input methods are consistent, and displays are well formatted with smooth transition from one to another. The program utilizes excellent error handling routines. Although the user is instructed to activate page returns via the RETURN key, pressing any key will advance the program to the next frame.

SUMMATION

Good content development, sound instructional design and excellent error handling combine to make "Algebra Drill and Practice I" a valuable supplement to classroom teaching. The program's chief drawbacks are the lack of metrication, the lack of an evaluation system, and the absence of a management system.

STATUS

"Algebra Drill aed Practice I" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $125.00 U.S. (1984) from Conduit at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Thereafter, disks may be replaced for $10.00.

BASIC NUMBER FACTS

DESCRIPTION

Title: Basic Number Facts
Author: None cited
Publisher: Control Data Publishing Company Inc.
Source: P.O. Box 261127, San Diego, CA 92126
Subject: Mathematics
Topics: Addition, subtraction, multiplication, division of whole numbers
Components: 1 disk, 1 backup, teacher's manual (50p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Atari 800, TI 99/4A

Version: 1982
Display Language: English
Cost: $50.00 U.S. (1983)
Tel. #: (714) 233-3784
Users : Elementary grades

OBJECTIVES

"Basic Number Facts" has two objectives:

1) Students will improve basic addition, subtraction, multiplication and division skills.
2) Students will learn to distinguish quickly among operations.

PEDAGOGICAL CONTENT DESCRIPTION

Using an animated automobile race track format, this disk provides drill and practice on basic number facts involving the digits 0 - 10. The student chooses addition, subtraction, multiplication, division, or a combination of all four and "wins" a race when less time is taken to answer 10 problems correctly than was taken in the previous race.

The disk contains four programs: "Soapbox" (addition and subtraction practice), "Drag Race" (multiplication practice), "Rally" (division drill) and "National" (a review of all four operations). Each program allows a maximum of 10 races and each race requires completion of 10 problems.

The manual contains two student worksheets for each level, an answer key and a sample recordkeeping sheet. Use of these materials is optional.

The accompanying 50 page teacher's manual provides a complete description of each program on the disk, suggests lesson flow and teaching strategies, includes sample student worksheets, and introduces preparation, follow-up, and supplemental activities to allow the teacher to use the disk with either individual students or with small groups.

PEDAGOGICAL CONTENT EVALUATION

Content range is very appropriate for the target audience, particulary the grade 2 - 3 levels. Adequate depth is provided in that the student answers 100 problems if (s)he chooses to run all 10 races; however, effective branching allows exiting of any program at any time. The user has control over sequence in that (s)he chooses both the type of operation (s)he wishes to undertake and the level of difficulty. Sequencing within programs is excellent. Not only are more difficult questions introduced as the student demonstrates skill, but questions answered incorrectly or hesitantly are reintroduced in subsequent races to insure mastery.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of deciding from the menu the type of race to be run and the entry level (applicable in two programs only). The student participates in a practice race by entering numerical answers to ten questions. The time the student takes in this race becomes his opponent's (i.e. the computer's) time in the first race. Each succeeding race consists of an additional 10 questions in which the student must better his/her speed and accuracy in order to win. As the student's time decreases (s)he is automatically moved on to a more difficult level.

Questions are randomly chosen from a limited data bank. Visual, quantitative and graphical feedback are provided: a correct response receives the message "O.K." and the user's race car moves toward the finish line; an incorrect response produces a hint such as "too large" or "two small", the opponent's car moves toward the finish line, and a second attempt is provided. The correct answer is supplied after three incorrect attempts. A help avenue in which questions are portrayed in picture form is available to the student by using CTRL-Q.

Quantitative feedback is provided at the end of each race and provides the number correct, indicates the questions answered incorrectly on the first try, points out the questions it took longest to answer and gives the time taken in seconds. At the end of ten races, graphs provide a summary of the number of questions answered correctly in each race and the time taken.

INSTRUCTIONAL FORMAT EVALUATION

This disk is designed as a drill and practice tool and as such provides no formal instruction. However corrective feedback and branching are well done and do provide instruction for the student experiencing difficulty. A student has three attempts at any answer and clues are given in the form of "too large" or "too small" after every attempt; however, if (s)he is still unsuccessful after three attempts a help branch visually depicts the problem under consideration and the student can literally count out the answer. The program provides effective review to ensure student mastery of concepts. For example, at the end of each race, questions answered incorrectly and questions answered slowly are highlighted to enable the student to study the correct response. Furthermore the computer keeps track of questions answered incorrectly and questions answered slowly and reintroduces these in subsequent races--if the student then gets them correct (s)he is rewarded with the message "Good! You got that one wrong before." The help avenue is well designed and a student can easily invoke it on any question--even before (s)he has attempted an answer if (s)he wishes. To encourage a student to think independently, the help function can be used only twice in any race. Positive feedback is equally well done.

A "practice run" at the beginning of each program enables the student to test his understanding of the operation of each race in a a non-threatening way, and is used to gauge a realistic time for the opponent car in the subsequent race. Effective branching allows the student to decide after each race whether he wishes to compete against his last time, his best time, or to set a new time for his opponent (only realistic time frames will be accepted).

TECHNICAL CHARACTERISTICS DESCRIPTION

Color and graphics are used in the program. Optional sound is used to simulate the race car engines.

TECHNICAL CHARACTERISTICS EVALUATION

An animated two-car race track format provides an easy to use motivating environment for basic math drill. Sound, which is used to simulate the reving of motors, adds motivation but can be user disabled. Displays are well spaced; however, the use of both upper and lower case letters may be unsuitable for very young students. The program is very easy to use but it does demand reading ability and therefore lower elementary students may require initial assistance. Students may also experience difficulty reading the closely spaced examples given in the help route. Branches are utilized effectively and provide smooth transition; however, it is annoying that the "exit" route takes the student back to the introductory title frames rather than directly to main menu.

SUMMATION

Effective use of sound and graphics keep interest high and the competitive time aspect encourages student self-improvement and adds motivation. The range, sequence and depth are all appropriate to the target audience. The effectively designed help route ensures that students experiencing difficulty are given the necessary remediation.

STATUS

"Basic Number Facts" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $50.00 U.S. (1983) from Control Data at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, a diskette may be replaced for $25.00 upon its return to Control Data.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

BINOMIAL MULTIPLICATION

DESCRIPTION

Title: Binomial Multiplication
Author: Mark Berman, Kevin Vessio & Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Mathematics
Topics: Binomial multiplication Using FOIL
Components: 1 diskette, backup, guide (3p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): IBM PC family

Version: 1984
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 8-11

OBJECTIVES

To give students practice in binomial multiplication using the FOIL method and to demonstrate the relationship between the FOIL method (multiplying the terms of each binomial in the order: First, Outside, Inside, Last) and the distributive and commutative properties.

PEDAGOGICAL CONTENT DESCRIPTION

The main menu provides the user with three options:

1. READ THE INSTRUCTIONS - This section introduces the contents of the disk.
2. LEARN ABOUT THE FOIL METHOD - A tutorial explains the meaning of FOIL and uses two examples to illustrate its application in multiplying binomials.
3. WORK ON PROBLEMS - Binomial multiplication problems in the form of (AX+B)(CX+D), (AX+BY)(CX+DY) or (AX+BY)(CX+DZ) are randomly generated where A, B, C, and D are integers. The user selects the number of problems (s)he wishes to solve (between 1 and 9) and is computer prompted through each step necessary to arrive at a solution.

PEDAGOGICAL CONTENT EVALUATION

Only one concept (binomial multiplication) is covered in this program; however, range, sequence and depth are all appropriate for the target audience and are effective in meeting the program's objectives. The tutorial is well sequenced and explains the FOIL method adequately; however, it is limited to just two non-randomized examples.

INSTRUCTIONAL FORMAT DESCRIPTION

The user has control over sequence via menu selection and controls rate by depressing the space bar. The amount of material is program controlled in the first two programs; however, in the practice section the user controls the amount by entering the number of questions (s)he wishes to do (limit of 9 questions per sitting). Questions in the drill and practice section are generated randomly with the following probability of appearance:

(AX+B)(CX+D) where the product is a trinomial - 50%
(AX+BY)(CX+DY) where the product is a trinomial - 30%
(AX+B)(CX+D) where the product is a binomial - 10%
(AX+BY)(CX+DZ) where the product contains no like terms - 10%

Textual feedback is provided after each response. Positive feedback is given for correct responses. A comment such as "That's not right, Joe. Try again." together with a hint (arrows are used to guide the student through the correct multiplication process) is given for each incorrect response. After two incorrect responses the correct answer is given. Then the same question is again posed and the student must answer it correctly before (s)he will be progressed to the next frame. An error analysis is provided at the end of each problem, and a total error summary is presented at the end of each set of problems.

INSTRUCTIONAL FORMAT EVALUATION

Terminolgy, sentence structure and instructional technique are all appropriate to the target audience; however, curricular fit is best at the grade nine level rather than at grade eight as suggested. The relationship between the FOIL method and the distributive and commutative properties is clearly explained. Student interaction is appropriate and the randomized questions cover each type of binomial multiplication satisfactorily. The program is soundly designed to accept either "2xy" or "2yx" as an equally correct answer. Although the amount of feedback provided is limited, it does adequately serve to guide a student to the correct answer. The fact that incorrectly answered questions are re-posed is educationally sound.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound and color are not used in this program. Text is presented in standard size, combined upper/lower case, with lines and arrows used to visually portray the terms to be multiplied.

TECHNICAL CHARACTERISTICS EVALUATION

The technical design is appropriate for the target audience. Questions are effectively centered on the screen, lines are used to aid clarity, and arrows add emphasis. The program is generally easy to use.

SUMMATION

This disk presents the concept of the FOIL method of binomial multiplication in a simple, well sequenced, straight-forward manner. The reinforcement provided for incorrect responses is effective, although including questions without program prompts or adding a post-test as a further check on student understanding might increase the educational value of this program.

STATUS

"Binomial Multiplication" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshop products are carried by Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

CODE QUEST

DESCRIPTION

Title: Code Quest
Author: None Cited
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Problem Solving
Topics: Using problems solving strategies to break codes.
Components: 1 disk & backup, teacher's guide (21p.)
System Requirements: Apple II+/IIe/IIc, 48K, disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only.

Version: 1983
Display Language: English
Cost: $49.00 U.S.(1984)
Tel. #: (914) 769-5030
Users : Grade 4 - 7

OBJECTIVES

As a result of using this package, students will develop skills necessary to problem solving including sequencing, decoding, analyzing, pattern identification, classification and discrimination.

CONTENT DESCRIPTION

The student is presented with up to six successive clues to aid in the identification of a mystery object or person. The clues, written in code form, include ciphers written backwards, number and alphabetic substitution, substitution of code words for a letter, transposition of ciphers using a box grid, and substituting pictures for letters. The student must apply the problem solving skills of discrimination, pattern identification, analysis, classification, sequencing, flexibility and trial and error in an attempt to solve the problem.

CONTENT EVALUATION

Content is accurate, easy to read, and relevant to the target audience. The range is geared for the high average, superior and gifted students in grades four, five and six, and proves an exciting challenge for this type of student. There is no preset sequence--students may choose one of six options presented by the main menu and may use a different type of cipher for each clue given. Each problem requires extensive thinking, thus providing ample depth.

The teacher option is well laid out and is very helpful to program operation.

INSTRUCTIONAL FORMAT DESCRIPTION

Students use the space bar or the return key approximately 15-25 times to advance frames during an average problem. Alphabetic keys are used to enter solutions, and the escape key permits exit from a problem. The mystery objects are randomly selected from a bank of twenty, with room for 80 more objects to be added. Textual feedback in the form of "That's right" or "I'm sorry that is not correct" is given after each problem. There is no quantitative evaluation nor are there any pre- or post-tests.

Two branches are available: A user experiencing difficulty may access a help branch which provides a clue for solving the problem, or the user may test a theory regarding the cracking of the code by entering a test branch.

Sequence, rate, and amount are student controlled.

INSTRUCTIONAL FORMAT EVALUATION

Students are actively involved in this program. Although the program is intolerant of misspellings, it will accept sentences with no spaces between the individual words.

Random generation of the mystery object is somewhat suspect: If programs are saved and sessions continued, true random generation exists; however, if the program is merely booted without saving, the "piano" usually begins the session.

Feedback was very predictable and unfortunately no corrective feedback was included. Including some form of graphical feedback may be appropriate for the target audience. The limitation to just one "help" clue per problem offers advantages and disadvantages: It insures that students think through clues very carefully and not make silly conjectures, but on the other hand it may prove insufficient for a student who is having difficulty.

The provision of student control of sequence, rate and amount is excellent.

TECHNICAL DESIGN DESCRIPTION

Standard size test is displayed in low resolution with high resolution used for colored graphics. Sound is not used.

TECHNICAL DESIGN EVALUATION

Displays are well formatted; however, the use of standard size test on a color monitor tends to result in poor resolution. Color plays an important role; however, the program could be operated on a monochrome monitor. Transition between frames is smooth and the disk is generally ease to use.

MANAGEMENT SYSTEM DESCRIPTION

Although this program does not have a management system as such, it does include a teacher option which allows the teacher to enter, delete, or view a mystery object or to delete student saved games.

The 21 page teacher's guide provides an introduction to the program objectives, background of the study of cryptography, a description of program contents and a description of each of the codes used in Code Quest.

MANAGEMENT SYSTEM EVALUATION

This program is easy to use in the classroom. Although students are required to do a fair amount of alphabetic input, the hunt-and-peck typist was not deterred. The teacher option was easy to operate even by users with no previous computer knowledge. The guide is well laid out, offers a wealth of information, and provides suggestions for adaptation to any subject area.

The capacity of saving up to 100 objects is excellent.

SUMMARY STATEMENT

This package develops problem-solving skills in an interesting and motivating manner.

STATUS

"Code Quest" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. The company provides a lifetime warranty on the disks and will replace defective diskettes at no charge.

In Alberta, Sunburst product's are carried by Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

COUNTERS

DESCRIPTION

Title: Counters
Author: Thomas C. O'Brien
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subjects: Mathematics, Early Childhood
Topics: Counting, addition, subtraction
Components: 1 disk with backup, teacher's guide (22p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, colour monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $49.00 US (1984)
Tel. #: (914) 769-5030
Users: Kindergarten - 1

OBJECTIVES

This program is designed to give children hands-on experience with counting and with counting as the basis of addition and subtraction.

PEDAGOGICAL CONTENT DESCRIPTION

This drill and practice program consists of three parts: counting, addition and subtraction. Counting and addition have five levels of difficulty, subtraction has two levels. Counting involves counting objects and matching arrangements of objects to numerals one through nine. Counting is sequenced in numerical order at Level 1 and proceeds to random order arrangements in Level 5. Addition at Level 1 begins with two collections of objects which the user combines to produce a single collection and then progresses sequentially to number sentences at level 5. The sums never exceed 9. When a user answers incorrectly, the program is sequenced so that the next problem will be an easier one. In the subtraction program, Level 1 deals with the separation of one collection into two parts. One part is shown on the screen and the user must reconstruct the other part. Level 2 involves number sentences with the largest number never exceeding 9.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence of the content are both appropriate and effective for the target audience. The user, with teacher supervision, can choose any one of three activities at any level. The sequencing from concrete to abstract is effective. The amount of content can be controlled by the teacher in order to accommodate the needs of the individual student. The visual explanations of wrong answers will likely need some teacher interpretation. There is sufficient practice at each level. The drills seem to hold the interest of the users and are appropriate for computer use. The content is accurate using large visual numbers and images which are appropriate for the intended users.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of pressing any key to select the correct answer when it appears on the screen. Pressing any key also allows the student to go on to the next question. The arrow and return keys must be pressed to access different programs but the documentation suggests that this be done by an adult.

In most drills the questions are selected randomly from a limited data bank; however, in Level 1 of counting the objects appear in numerical order beginning with one object and ending with nine objects. When a user answers incorrectly, the program is set so that the next problem will be an easier one.

Two types of feedback are used in this program. Correct answers are rewarded with flashing numbers or animated graphics and audio beeps. An incorrect response results in a large "X" across the incorrect answer. A visual explanation is then given. There is no quantitative feedback.

No pre- or post-tests are included in this program.

INSTRUCTIONAL FORMAT EVALUATION

The instructional format is effective with activities that are suitable for the the intended audience. Student interaction is appropriate and effective; however, due to the method of questioning chosen, some questions take a long time to present. The student can learn through manipulation of objects in the content. Some students may have difficulty counting graphic objects from right to left. The use of animated graphic objects is appealing to this age group. There is no time limit and if a student misses acknowledging the correct answer, the question reappears in a few seconds. The program has no allowance for the correction of wrong answers. The questioning technique and feedback are appropriate and effectively meet the objectives of program; however, it is unfortunate that no quantitative feedback is provided. The visual assistance which is provided as part of the negative feedback may need adult interpretation for some of the students. The lack of evaluative and record keeping tools is a weakness. The program will require some teacher or adult supervision when an assessment of the student progress is desired.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses a combination of graphics, color and sound. The numerals are extra large. Enlarged print is used in the menu while standard size print in upper and lower case appears in the instructions. A color monitor is desirable.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are well designed, appropriate and effective for most intended users. Color and graphics with animation add to the effectiveness of the program. Sound is not optional and will likely cause some distraction if the program is used in the classroom. Instructions are available on the disk but these are intended for the teacher. The program is easy to use and appears to be reliable. The teacher will need to give the student some assistance at the initial stages but this will likely be limited. Flashing graphics are used throughout the program; at times this is limited to digits or animated figures but at other times the entire screen will flash on and off in different colors. Teachers of students with epilepsy should be aware that there is some possibility that such flashing may trigger seizures.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Prerequisites:

1. The student will need to be able to count to nine and recognize the numerals to 9.
2. No management system is included in this program.
3. The teacher documentation includes a rationale for the concept of counting, a description of the three programs, suggested follow-up activities and information on computer use. There are no user support materials included.

IMPLEMENTATIONAL SUPPORT EVALUATION

The entry competencies are appropriate for the target audience. The documentation provides sufficient information for easy use of the program. The lack of a management system does not preclude the use of the program but the addition of such a system would make it more useful. The program is easily adapted to a classroom setting and can be readily implemented by a teacher with minimal computer competency. Little supervision is required after the initial instruction.

SUMMATION

The content, instructional format and technical quality are generally good for the intended users. A management system would be a beneficial addition for the teacher. This could provide the teacher with evaluative information and thus reduce student supervision time. Allowing a second chance to obtain the correct answer before the explanation is given would also improve the program.

STATUS

"Counters" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, Sunburst products are carried by Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

EQUATIONS II

DESCRIPTION

Title: Equations II
Author(s): Mark Appel & Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Avenue, Port Chester, NY 10573
Subject: Mathematics
Topics: Solving equations with variables on both sides of the equal sign
Components: 1 disk, backup, teacher's guide (9p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80, Commodore 64

Version: 1984
Display Language: English
Cost: $29.95 U.S. (1985)
Tel. #: (914) 937-5440
Users: Grades 8 - 11

OBJECTIVES

This program is designed to give students practice in solving equations with a variable on both sides of the equation using the axioms of addition, subtraction, multiplication and division.

PEDAGOGICAL CONTENT DESCRIPTION

This program covers solving linear equations in the form of "Ax + B = Cx + D" where A, B, C and D are integers and A, C are not equal to zero.

An introduction includes an explanation of 5 procedural rules, the procedure used if a mistake is made, two types of errors and a sample problem. To solve an equation, the user chooses one of the five rules which allow the student to add, subtract, multiply, divide or simplify both sides. After the rule is chosen, the program then steps the user through the process. The user can choose to complete between 1 and 50 exercises.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence, while limited, are appropriate to the target audience and to the intents of the program, i.e. to teach a procedure which can be applied to more difficult problems. As such, there is no development from easy to difficult as the object is to provide practice in following a structured approach. The depth is somewhat lacking in that definitions and explanations are not accessible when required, but sufficient practice is provided. The students will likely require some assistance from the teacher to supplement the introduction to the program. The program does not allow students an extra step even though that step would lead to the correct solution.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, and numeric inputs. The student uses "Y" or "N" in branching, "RETURN" for page turning, and "R" for paging backwards. The drill questions require the user to select the proper step from a menu and input the simplified forms of the equations.

The questions are randomly generated and the user may choose from 1 to 50 problems.

All feedback is textual. Correct responses to each step result in the program proceeding through the solution process until the correct answer is obtained. Positive feedback is provided only at the end of a correct problem. If an incorrect answer is given, the student is given another chance to respond. If the second response is wrong, the correct answer with a brief explanation is given and the student must input the answer. Quantitative feedback giving procedural and computational errors is provided at the end of each problem and also at the end of a drill. This information can be printed.

No pre- or post-tests are provided.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate in that the student is actively involved throughout the program. The interaction is consistent with the student working through a very structured problem solving approach. Student solutions involving extra steps will not be accepted. The repetitious patterns of the interaction are appropriate for students who may be having difficulties; proficient students would find them tedious as they do not need this level of help.

The questions are appropriate and effectively randomized, but they are not sequenced from easy to hard.

The feedback is appropriate. The explanations which are given with incorrect responses are effective. The quantitative feedback including procedural and computational errors can be printed for teacher use.

The lack of an evaluation component is a weakness, but the summation of errors can perhaps be helpful in this regard.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are in standard size print with upper and lower case letters. Inverse text is used for highlighting and the student can reread pages in the explanation. Graphics, sound and color are not used in this program.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are appropriate and easy to read. The inverse print used in highlighting is effective in attracting the user's attention.

The program is easy to use and appears to be reliable under normal use. Generally, the technical design is satisfactory.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Although the documentation does not identify any specific entry coampentencies, students need to know how to add like terms, have knowledge of the basic operations with integers and be able to solve simple equations before using this program. The teacher should explain the five rules to be used and a solution path that involves an extra step.

No management system is provided in this program.

The teacher documentation includes the objectives, suggested grade levels, program description, a sample problem and its solution.

No user support materials are provided.

IMPLEMENTATIONAL SUPPORT EVALUATION

The specific entry competencies noted above are required and appear to be appropriate for the target audience.

The lack of a management system and the absence of user support materials are disadvantages.

The program is easy to use for the student and teacher. Minimal teacher introduction and supervision are required. The program can be used by individuals, small groups, and may even be suitable for a whole class demonstration.

SUMMATION

This program provides a clear and structured step-by-step approach to solving equations. Student interaction is good and the program is easy to use. This is a very good program for remediation.

It would be helpful to have problems sequenced from easy to difficult as the disk could then be used by a wider target audience.

STATUS

"Equations II" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1985) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshops products are carried by Edupro Software. Contact the company directly for availability, price and warranty information (see page v. of the preface).

FACTORING ALGEBRAIC EXPRESSIONS

DESCRIPTION

Title: Factoring Algebraic Expressions
Author: Mark Berman, Kevin Vessio & Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Mathematics
Topics: Easy quadratic trinomials, harder quadratic trinomials, difference of two squares, common factor, mixed problems
Components: 1 diskette, backup, guide (2p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): IBM PC family

Version: 1984
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 9-12

OBJECTIVES

This package is designed to provide students with:

1. Practice in factoring algebraic linear and quadratic expressions.
2. An understanding of the factoring process by simulating the procedure used in the classroom.

PEDAGOGICAL CONTENT DESCRIPTION

Four types of factoring problems are covered in this program:

1. Quadratic trinomials with an x coefficient of 1
2. Quadratic trinomials with an x coefficient of 2, 3, or 4
3. Difference of two squares of the form a x -b where a is 1, 2, or 3 and 1< b <10
4. Common factors of quadratic and linear binomials in x.

In addition a fifth program presents a mixture of the above four problem types.

The program includes a brief explanation of the procedures for solving the problems along with provision for help in solving the problem and/or for seeing the solution. The user selects the number of questions to be done (1-9) and an error analysis is given after each individual problem attempt.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence are most appropriate for the younger portion of the target audience although the program would be appropriate for review for older students. Content in the "Common Factor" and "Difference of Two Squares" programs is restrictive and could be improved by the addition of other variables and the inclusion of a wider variety of numerical coefficients. Depth is generally insuffiсent in all programs due to insufficient instruction and example problems. A well-designed help avenue which allows the user to see what the results of expansion will be as (s)he changes the components of the factors does partially compensate for this however. In general the provision for practising any one type of problem or all four types at once and the ability to get limited assistance are strengths of the program.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of using the RETURN, arrow, "+", "-" and number keys. "H" and "S" keys are used for tutorial instruction. Questions are randomly generated within the parameters described in the documentation. Feedback is provided after each answer, and an error analysis follows each problem attempt. Errors are descibed by comparing the expanded polynomial of the user factor to the polynomial under consideration and diagnosing where the differences were generated. When the problem is corrected, a summary of errors for all attempts at the problem is given which includes:

1. Format of the factors
2. Finding the common factor
3. Difference of two squares
4. Leading coefficient
5. Sign of the constant term
6. The constant term
7. The linear term.

INSTRUCTIONAL FORMAT EVALUATION

Questions are randomly generated from a limited test bank and are representative of sample questions outlined for each program in the user's guide. Sequencing within a menu choice is program controlled; however, the user has appropriate control over rate and amount (to a maximum of 9 questions/set). Immediate feedback is provided and messages generally have appropriate degrees of commiseration and encouragement. The help and solution branches are effective in accommodating ability differences among users and are major strengths of the program.

The error display summaries which appear after each problem may be of questionable interest to the user; however, they would be useful for the teacher.

TECHNICAL CHARACTERISTICS DESCRIPTION

The screen is consistently divided into three areas: the questions is posed at the top, the middle area is used for work space, and the bottom is reserved for messages, correction cues and key use reminders. All text is presented in standard size, upper case formation. Neither graphics nor color are used.

TECHNICAL CHARACTERISTICS EVALUATION

This program is easy to use and is bombproof. The design is appropriate and clear in most cases, although the message area at times gets crowded. Error trapping is generally good, although an answer such as (-x-2)(-x-1) in the place of (x+2)(x+1) is not permitted. The use of a combination of upper/lower case text might be more appropriate for the designated audience.

SUMMATION

The strengths of this program (good content sequence, a well-designed help avenue, clearly formatted question screens, and reasonable price) outweigh the weaknesses mentioned earlier.

STATUS

"Factoring Algebraic Expressions" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshop products are carried by Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

FAST FACTS

DESCRIPTION

Title: Fast Facts
Authors: Steketee Educational Software
Publisher: EduSoft
Source: P. O. Box 2560, Berkeley, California, 94702
Subject: Mathematics
Topics: Whole number facts
Components: 1 disk, guide (2p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS 80, Atari

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (415) 548-2304
Users : Elementary grades

OBJECTIVES

To provide timed drills on whole number facts.

PEDAGOGICAL CONTENT DESCRIPTION

There are five programs on the disk. Each program allows the user to select the operation that is to be practiced (addition, subtraction, multiplication and division). Most of the programs also allow the user to be drilled on an assortment of operations. During the drill, the user (or the users) answer a minimum of 10 questions, each within 10 seconds. Scores are based on accuracy and speed. If the user elects to play the game again, (s)he is encouraged to beat her/his previous high score.

The five programs are:

1. Beginner Fast Facts - practice at a slow pace
2. Solo Fast Facts - 10 questions @ 10 seconds per question
3. Team Fast Facts - a team of 2 to 5 members play the game
4. Competition Fast Facts - students play against a competitor
5. Marathon Fast Facts - 100 different number facts with a 10 second time limit.

PEDAGOGICAL CONTENT EVALUATION

Content range, sequence and depth are all appropriate. The ability to choose any one of the operations, or a combination of operations, makes this disk appropriate at a number of grade levels.

INSTRUCTIONAL FORMAT DESCRIPTION

Students enter numerical answers and the computer evaluates each digit upon entry. The user also chooses from the menu page, elects to play again and has the opportunity of repeating questions which were wrong.

Feedback consists of both sound and aural messages presented after one attempt. If the answer is correct, the student sees the word "yes" and hears a short beep. If the answer is wrong, a buzz is heard and the correct answer is then presented along with another tone signal. Sound is optional and may be turned off at the menu. Quantitative feedback is given at the end of the drill and the user is encouraged to beat the score. In some games, a "half time" score is also given.

Questions are randomized. If an error is made, the student will be given the choice of increasing his/her score by attempting those questions again.

INSTRUCTIONAL FORMAT EVALUATION

The user is given only one attempt at a question and thus may be penalized for typing errors. (2 digit answers will be counted wrong immediately if the first digit is incorrect.) As this is intended as a speed drill, this feature is not particularly damaging.

It may have been advantageous to allow the user or the teacher some control over the time limit.

The instructional format is generally good within the restrictions of the speed drill format. The re-presentation of errors makes this disk a "cut above" the other speed drills.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are presented in large size print. As indicated earlier, sound is optional.

TECHNICAL CHARACTERISTICS EVALUATION

The time limit in "Solo Fast Facts" is approximately 5 seconds and not 10 as described. Also, it may have been a good idea to include an escape feature, particularly in the last program. Generally speaking however, the technical design is good.

SUMMATION

The disk is intended to provide speed drills on number facts. Within those limited objectives, it does a good job. The provision of a number of different "games", the re-presentation of incorrect answers, varying quantitative feedback and technical design are all strengths to a reasonably priced disk.

STATUS

"Fast Facts" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from EduSoft at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, diskettes may be replaced for $5.00. EduSoft authorizes the original purchaser of each program to make one backup copy of each program for archival purposes.

Alberta distributors of EduSoft products include Alphatel Computer Products. and Edupro Software. Contact the companies directly for price and warranty information (see page v. of the preface).

FAY: THAT MATH WOMAN

DESCRIPTION

Title: Fay: That Math Woman
Authors: David Vincent & Paul Melhus
Publisher: Didatech Software
Source: 549 - 810 West Broadway, Vancouver, BC V5Z 4C9
Subject: Mathematics
Topics: Addition, subtraction, multiplication and division of whole numbers
Components: 1 disk, instruction sheet
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Commodore 64

Version: 1983
Display Language: English
Cost: $29.95 (1984)
Tel. #: (604) 687-3468
Users : Elementary

OBJECTIVES

This program is designed to reinforce student skills in:

1. Recalling basic arithmetic facts up to and including 19
2. Completing basic operations with whole numbers at the pictorial and abstract levels
3. Using the number line to solve arithmetic equations
4. Conceptualizing subtraction as the inverse of addition and division as the inverse of multiplication
5. Recognizing multiplication as the grouping of equal numbers
6. Understanding the concepts of less than and greater than.

PEDAGOGICAL CONTENT DESCRIPTION

This program provides drill on the addition, subtraction, multiplication and division of whole numbers less than nineteen. The menu offers eight choices: addition; subtraction; addition and subtraction; multiplication; division; all four operations; help and exit.

Programs 1, 2, 5 and 6 present 15 problems in various arithmetic drill areas in which questions are "enacted" on a 0 - 18 number line. Programs 3 and 6 are arithmetic games which terminate when a student takes too long to answer a question. The "Help" program provides instruction on entering answers, controlling sound, and temporarily interrupting a program.

Each question is given a point value with that value decreasing as the length of time a student takes to answer a question increases. After each program is completed the student is given the option of proceding to the next level or returning to the menu to choose a different level.

PEDAGOGICAL CONTENT EVALUATION

Portraying all questions on a 0 - 18 number line adds clarity to abstract concepts but necessarily limits the range. (This is particularly evident in the multiplication and division sections.) While students have the option of selecting any program from the menu, proceeding through the programs in order provides excellent sequencing in that it begins with addition, then introduces subtraction, and next combines these two in a game format. Similarly, multiplication is introduced, followed by division and finally a cumulative game combines all four activities. Sequencing is also evident in the corrective feedback in that if a student misses an answer (s)he is dropped back one level and given easier computational problems to build his/her skill. The option of repeating any section insures adequate depth.

Since "Elevator Math" sections depend upon slow responses in order to terminate, brighter students may end up working on these sections for a long period of time with little new learning taking place.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of number entry for menu selection and answer input followed by pressing the RETURN key. Questions are effectively randomized within each program and immediate feedback is provided. For a correct answer, Fay moves along the number line the appropriate number of spaces, smiles, jumps up and down, and then jumps up to the next number line. For an incorrect answer, Fay moves along the number line to the incorrect answer, gives a "raspberry" sound, and then the same question is reposed. A second incorrect response results in a repeat of Fay's actions followed by Fay doing a demonstration of how to achieve the correct answer. After two incorrect answers, Fay drops down one number line. The points awarded for each correct answer are in indirect proportion to the amount of time taken to answer a question. In levels 3 and 6 Fay is chased by a set of random numbers which increase in proximity in direct proportion to the time taken to answer a question. When they catch Fay the game is over.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique and amount of student interaction are appropriate for the target audience. The fact that the number line extends only to 18 may restrict the potential use of this program by above average students, especially those in grades 3 and 4. Questions are randomly generated and feedback is effective. Fay walks the number line to visually impact both correct and negative responses. A second incorrect response is followed by Fay enacting the correct answer with sound being advantageously used to reinforce the counting process.

Students may experience some confusion in the addition section due to the fact that two different number line models are used. In Level 1 and on the bottom number line of Levels 3 and 6, "a + b" is enacted by Fay starting at zero, walking to "a", and then walking to "b". On the remaining number lines "a + b" is depicted by Fay starting at point "a" and walking to point "b".

Motivation is kept high by:

1. Being able to see the answer being logically stepped out
2. Having the score obtained tied to the number of seconds taken to respond
3. Presenting a cumulative end score
4. Promoting competition by flashing the name of the student with the highest end score at the beginning of each program.
5. Visual impacting by moving Fay up one level each time a response is correct.

The fact that this disk uses a female figure to enact mathematical solutions may aid in breaking down the stereotype that "math is for boys".

TECHNICAL CHARACTERISTICS DESCRIPTION

Color and high resolution graphics are used to depict the number line, the scoreboard display, and the animated character Fay. Sound can be user disabled.

TECHNICAL CHARACTERISTICS EVALUATION

This program makes excellent use of animated graphics to have Fay "walk out" the answer. While this could be an interesting approach to teaching relationships, it does become tiresome with time. Sound, which can be disabled, adds interest. The only branching allowed in this program is pressing ESCAPE to freeze or restart the program and this becomes a negative feature in that it can be used to default the timed response score. The program is thoroughly bomb proofed. It is designed to only accept numbers of 18 or less, it checks for and rejects swear words, etc. Independent use of the program is hampered by the fact that instructions are not presented at the beginning; however, they are available as a help option.

SUMMATION

This program utilizes fine technical design to provide motivating drill exercises in the basic arithmetic functions of addition, subtraction, multiplication and division of whole numbers up to and including 18.

STATUS

"Fay: That Math Woman" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 (1984) from Didatech Software at the address given at the beginning of the report. Defective diskettes will be replaced without charge at any time. Disks which are damaged by the user will be replaced for $10 upon return of the diskette.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

FRACTION FACTORY

DESCRIPTION

Title: Fraction Factory
Author: Robert Eyestone
Publisher: Springboard Software
Source: 7807 Creekridge Circle, Minneapolis, MN, 55435
Subject: Mathematics

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1983)
Tel. #: (612) 944-3912
Users : Grades 3 - 6

Topics: Fractions of a set, equivalent fractions, fractions of a number, addition and subtraction of fractions
Components: 1 disk, teacher's guide (6p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): IBM PC, Atari, Commodore 64

OBJECTIVES

This disk is designed to provide drill and practice in:

1. Writing fractions
2. Writing fractional equivalents
3. Finding a fractional part of a whole number
4. Adding proper fractions of different denominators
5. Subtracting proper fractions.

PEDAGOGICAL CONTENT DESCRIPTION

The program offers the user drill and practice in five different areas: finding fractions of a set, finding equivalent fractions, finding fractions of a number, adding fractions, and subtracting fractions. The program uses graphics such as number lines and rectangles divided into equal portions and symbols such as hearts, diamonds, circles, trees and asterisks to portray problems. Each game consists of ten questions.

PEDAGOGICAL CONTENT EVALUATION

Content range is appropriate for the target audience. There is good sequencing from one program to the next and linear sequencing results in an increasing complexity of problems (i.e. an increase in the size of the denominator). Depth is effective in that the student is given 10 questions but has the option of choosing to do ten additional problems.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, entry of the numerical, Y, N and ESCAPE keys. Three types of questions are posed: word questions, computational problems and visual problems, all of which require numerical input. Visual feedback is provided for each correct reponse. This is then "tallied" and culminates in visual and sound feedback when 10 correct answers have been entered. Incorrect reponses receive successively more detailed prompts, with the correct answer being displayed in conjunction with the last prompt. Sequence and rate are user controlled while the amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The type of questioning and amount of student interaction are appropriate and feedback is effective. Explanations appropriately include both text and a demonstration example. The program only records correctly answered questions. While this provides positive reinforcement, some indication of the total number of questions attempted and the number answered incorrectly may provide useful evaluation. The program does not incorporate any form of remedial branching for the student who may be experiencing difficulty. For example, a student who answers 20 successive questions incorrectly is simply posed with another problem rather than being given instructional assistance.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution colored graphics and sound are used throughout the program.

TECHNICAL CHARACTERISTICS EVALUATION

Colored graphics are effective in conveying concepts and in aiding student motivation, although the "bouncing head" moving up a staircase proves very time consuming. The 'picture' menu is also time consuming and adds little to the package. While sound adds interest, it unfortunately cannot be user disabled and may prove disruptive in a classroom. Large sized text is appropriately used.

SUMMATION

This program effectively utilizes graphics, color and sound to convey instructional concepts. While the program does not incorporate any remedial branching or record of incorrect reponses, incremental prompts to incorrect responses are well done.

STATUS

"Fraction Factory" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1983) from Springboard Software at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period unless the product has been damaged by accident, abuse or modification.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

GEOMETRIC CONCEPTS: AREA

DESCRIPTION

Title: Geometric Concepts: Area
Author: Dr. Lola J. May
Publisher: Jostens Learning Systems
Source: c/o Trinity Ventures Corp., B5-4255 Arbutus, Vancouver, B.C. V6J 4R1
Subject: Mathematics
Topics: Area of rectangles, squares, parallelograms and triangles
Components: 3 disks, teacher's guide (52p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $120.00 U.S (1985)
Tel. #: (604) 734-0232
Users : Grades 6 - 9

OBJECTIVES

After completing these disks the student will be able to apply the appropriate formula to calculate the area of a rectangle, square, triangle, parallelogram, or irregular region composed of rectangles.

PEDAGOGICAL CONTENT DESCRIPTION

This package contains three disks, Series C, D, and E, each of which has six instruction units, four review units and two test units.

SERIES C explores the area of rectangles and squares by counting the number of squares contained in an outline, developing the formula "A=lw", and applying this formula to calculate the area of various rectangular figures. All measurements are metricated and are limited to whole numbers. A student is allowed two or more errors before (s)he is directed to a review lesson.

SERIES D explores the calculation of the area of irregular figures composed of rectangular shapes by calculating the area of the various small rectangles, totalling them, and adding/subtracting them from the whole. Lessons progress from simple to more complex shapes, and students are expected to do pencil and paper calculations.

SERIES E develops the formula for the calculation of the area of a triangle, and provides practice problems, review sections and an evaluation.

PEDAGOGICAL CONTENT EVALUATION

Content range is appropriate for the lower end of the target audience and could be used for review and remediation by grade eight and nine students. Sequence is logically developed. Definitions and explanations are effectively handled and examples are clearly presented. Hints are given to guide the student to the correct answer; however, they are not always specific enough to lead to a further understanding of the problem. As depth is somewhat shallow, program strength would be improved by including more practice problems on the disk and/or as part of the user support materials.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of the entry of his/her name and class number, hitting the RETURN key to turn pages and calculating and entering numerical answers together with their appropriate units. Typing "H" or "F" will access hints or formulas.

Questions are pre-programmed. Feedback is immediate: correct responses receive positive comments such as "Good Work"; incorrect responses receive the message "Think" followed by a hint. After two incorrect attempts the answer (complete with a step-by-step solution in some cases) is given. Quantitative feedback is provided at the end of all units with the exception of the review units.

Sequence and amount are program controlled; rate is user controlled.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is appropriate and effective for the target audience and frequent student interaction aids motivation. Pre-programmed questions result in logical, sequential topic development. Feedback is generally appropriate; however, sometimes the negative feedback does not distinguish between a wrong answer and wrong format. Help branches are good but explanations should be expanded. Tests accurately reflect the content covered; however, the record keeping system computes totals only and does not diagnose students' weak areas.

TECHNICAL CHARACTERISTICS DESCRIPTION

These disks use combination upper/lower case lettering. High resolution colored graphics are used to portray shapes and directional arrows.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are clear and well formatted and transition from one to another is smooth. Color adds interest but is not mandatory for program operation. Younger students may be overwhelmed by the amount of textual explanations. The use of upper case letters to label diagrams is non-traditional and may be confusing (e.g. A=LW should be A=lw).

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The management system offers five options: Display entire class list; Display a single record; Erase a student record; Change disk or class number; Exit the management system. Student records are automatically created as users enter their name upon booting the disk. Teachers have the option of viewing student scores on the screen or in hard copy form. A maximum of 120 records are allowed and these can be divided into eight groups or classes.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to use and all functions operate as outlined. The fact that all class lists are automatically alphabetized is a program plus. Collecting and printing student data is easy; however, as the program prints a total percentage score only, no diagnostic data is available. The addition of a feature to allow teacher control of student entry points and/or learning sequences would be helpful.

SUMMATION

The program content is well suited to computer instruction. Good incremental sequencing combined with automatically invoked review sequences for students experiencing difficulty results in sound educational design.

STATUS

"Geometric Concepts: Area" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $120.00 U.S. (1983) from Trinity Ventures Company at the address given at the beginning of the report. Defective diskettes will be replaced for $5.00 U.S. - no time limit has been indicated. Other than initially defective diskettes, no warranty is provided.

GEOMETRIC CONCEPTS: PERIMETER

DESCRIPTION

Title: Geometric Concepts: Perimeter
Author: Dr. Lola J. May
Publisher: Jostens Learning Systems Inc
Source: c/o Trinity Ventures Corp., B5-4255 Arbutus, Vancouver, B.C. V6J 4R1
Subject: Mathematics
Topics: Perimeter of rectangles, squares, parallelograms, and triangles
Components: 2 disks, teacher's guide (52p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $80.00 U.S.(1985)
Tel. #: (604) 734-0232
Users : Grades 6 - 9

OBJECTIVES

After completing these disks, the student will be able to calculate the perimeter of a rectangle, square, triangle, or polygon initially by counting unit lengths along the sides, then by completing an appropriate formula involving the provision of missing lengths, and finally by solving perimeter problems without the aid of diagrams.

PEDAGOGICAL CONTENT DESCRIPTION

This package contains two disks, Series A and Series B, each of which contains six instruction units, four review units, and two test units. Each lesson begins with a page of directions followed by notes and instructions, questions, and drill exercises. Lessons are progressive in difficulty. Students begin with very simple substitution problems and progress to using the formula $P = 2(l+w)$. Users are automatically routed to a review lesson if two or more consecutive errors are made on an instruction lesson.

PEDAGOGICAL CONTENT EVALUATION

Content range is appropriate for the lower end of the target audience and could be used for review and remediation by grades eight and nine students. The logical easy to hard sequence is an advantage but better students may find the rate of progress too slow. The depth is good as there are instruction units, drills and tests. Other strengths are the referral to a review lesson after consecutive errors in the lesson and the provision of help and formula pages.

Some problems with clarity may exist as diagrams are occasionally shaded and at other times outlined--this inconsistency could be confusing to some students. Furthermore, regular shapes do not have their sides labelled to indicate equality, and screen distortion often makes this difficult to determine visually.

Student support materials have not been provided and their addition would greatly enhance the depth and range of material provided.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entering his/her name and class number, hitting the RETURN key to turn pages, and calculating and entering numerical answers together with their appropriate units. Typing "H" or "F" will access hints or formulas.

Questions are pre-programmed. Feedback is immediate: correct responses receive positive comments such as "Good Work"; incorrect responses receive the message "Think" followed by a hint. After two incorrect attempts the answer (complete with a step-by-step solution in some cases) is given. Quantitative feedback is provided at the end of all units with the exception of the review units. This evaluation is based on the results of the first attempts and provides a total percentage score--no diagnostic evaluation is available.

Sequence and amount are program controlled while rate is user controlled.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is appropriate and effective for the target audience and frequent student interaction aids motivation. Pre-programmed questions result in logical, sequential topic development; however, randomized questions would be more appropriate in the advanced lessons as would greater depth of explanation.

Feedback is generally appropriate and the provision of detailed solutions is an advantage. However, the negative feedback does not always distinguish between the wrong answer and the wrong format and help branches should be expanded to provide more assistance than the one or two sentences which are given. Tests accurately reflect the content covered; however, the record keeping system shows total scores only and does not isolate a student's weak areas. The programs lack any defined evaluational criteria for success.

User control is effective, but there is a need for at least some teacher control and less program control in order to effectively individualize instruction.

TECHNICAL CHARACTERISTICS DESCRIPTION

The disks use combination upper/lower case lettering. Colored graphics are used to portray shapes and directional arrows.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are appropriate and change unobtrusively, diagrams are identifiable, and input methods are reasonably consistent. The upper case characters used in formulae are not standard to mathematics and may therefore be misleading. Younger students may find the amount of text material presented per page to sometimes be excessive.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A management system is included with each disk and it offers five options: Display entire class list; Display a single record; Erase a student record; Change disk or class number; Exit the management system. Student records are automatically created as users enter their name upon booting the disk. Teachers have the option of viewing student scores on the screen or in hard copy form. A maximum of 120 records can be maintained.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to use and all functions operate as outlined. The fact that all class lists are automatically alphabetized is a program plus. Collecting and printing student data is easy; however, no diagnostic data is available--the program prints a total percentage score only. There is no password available and hence no program security is offered.

SUMMATION

The major strengths of these disks are the methodical, systematic presentation of material and their general ease of use. Weaknesses include the non-standard use of upper case letters in labelling polygons, insufficient depth of instruction for students not experiencing success, and the lack of diagnostic and prescriptive evaluation data for the teacher via the management system. These weaknesses are minor when compared to the strengths of the content development.

STATUS

"Geometric Concepts: Perimeter" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $80.00 U.S. (1985) from Trinity Ventures at the address given at the beginning of the report. Defective diskettes will be replaced for $5.00 U.S. - no time limit has been indicated. Other than initially defective diskettes, no warranty is provided.

GRAPHING EQUATIONS

DESCRIPTION

Version: 1983
Display Language: English
Cost: $60.00 US (1984)
Tel. #: (319) 353-5789
Users: High School

Title: Graphing Equations
Author(s): Sharon Dugdale & David Kibbey
Publisher: CONDUIT
Source: University of Iowa, Oakdale Campus, Iowa City, IA 52242
Subject: Mathematics
Topics: Graphing linear & quadratic equations
Components: 1 disk with backup, teacher's guide (18p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

OBJECTIVES

As a result of using this disk students will:

1. Recognize the basic shapes of graphs.
2. Know how to translate graphs horizontally and vertically and perform other manipulations on them.
3. Locate linear and quadratic graphs that are hidden on a coordinate plane and determine their equations.
4. Experience the plotting of conic equations.

PEDAGOGICAL CONTENT DESCRIPTION

The four programs contained on this disk all deal with the graphing of equations:

LINEAR AND QUADRATIC EQUATIONS - Students, given a choice of difficulty levels, are asked to write an appropriate equation for a given graph. Successive tries are allowed until the plotted graph of the student equation matches or closely parallels the target graph.

GREEN GLOBS - The computer displays coordinate axes with 13 randomly scattered globs. Given a choice of "novice" or "expert" playing levels, students enter equations which they feel will hit the globs and cause them to explode. The "expert" game adds shot absorbers which stop any shots that touch, so the student must design equations to avoid these points.

TRACKER - After choosing to play as an "expert" or a "novice", students attempt to locate linear and quadratic graphs (lines, parabolas, circles, ellipses, or hyperbolas) that are hidden in the coordinate plane and determine their equation.

EQUATION PLOTTER - This program is a general utility plotter program which can be used with other programs on the disk or with work from textbooks as part of classroom study. It provides the student with the choice of two shapes of grids which the students can use to plot x and y coordinates.

PEDAGOGICAL CONTENT EVALUATION

Provided the student has had prior classroom instruction in graph plotting, this program provides excellent drill and has a good content range for grades 10 - 12 students. The progression from plotting lines to plotting trigonometric functions provides good sequencing. A choice of difficulty levels and the option of branching back for review provides good depth. The variations of each type of equation are well covered and the flexibility of entering a program at different levels provides for varying individual abilities.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of keyboard input of equations which correspond to a given graph, using the RETURN key to accept a selection, and using the ESCAPE key to exit a program. Immediate feedback is provided. Positive feedback consists of a word such as "Right" coupled with the student graph being drawn over the dots, thus causing them to explode. During a game the number of points earned is also shown. Negative feedback is largely left to inference in that the student can see that his/her plotted graph does not match the target graph. A student can enter as many answers as (s)he would like, or by pressing "A" can forfeit the game at which time the answers are shown. The user controls rate and sequence. Advancement within a program is dependent upon user success (i.e. if a student matches a graph on the first try, (s)he advances to the next level).

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate and the instant graphic comparison of plotted graphs provides good feedback. Because every answer is graphed, the student can learn from his/her mistakes, and the opportunity for unlimited tries at a question is a program strength. Accumulation of points and advancement within a program from one level to the next provides good motivation. The ability to enter a specific program without going through other parts of the disk provides for varying student abilities.

Program strength could be enhanced by: 1) Allowing students to enter sample equations in the introductory program to provide practice in entering equations on a computer (i.e. difference in symbols, shifting for keys, etc.) and 2) Including pretests as a guide for the level at which students should begin working.

TECHNICAL CHARACTERISTICS DESCRIPTION

Screen displays consist of large size, combination upper/lower case text and high resolution graphical displays complete with color. Sound is used to simulate the explosion of globs.

TECHNICAL CHARACTERISTICS EVALUATION

This program utilizes fine technical design. Text is easy to read, graphics are clear, and sound adds an element of excitement to the games. There is a clear indication of where and when input is required. Also, the designers have effectively reconfigured some keys so that it is not necessary to press the SHIFT key to get "^" or "+" operations, and the graphics display a true exponent rather than a BASIC statement.

The actual graph plotting in "Equation Plotter" can be extremely slow (plotting a single graph of a complex function can take as long as three minutes), thus although the program serves as an excellent demonstration tool, its slow plotting time may exceed the student's attention span.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A management system automatically records the top ten scores in the games "Green Globs" and "Tracker". Via a password, the teacher has access to the management system and can change names, delete names and score, or start a new records list.

The eighteen page instructor's manual provides program objectives and descriptions, examples problems, scoring procedures, and explains the differences between novice and expert playing levels.

IMPLEMENTATIONAL SUPPORT EVALUATION

The teacher documentation is easy to read, informative and valuable as a quick reference aid. The management system works as described. The disk is easy to use, adaptable to a wide variety of student levels, and requires minimal physical dexterity and little teacher intervention.

SUMMATION

Program content is appropriate to the computer media, and sequence and depth are appropriate to the target audience. The game approach utilized on these disks provides strong incentive for a student to improve his/her graphing abilities. The programs are easy to use, students can enter at varying levels, and little teacher intervention is required.

STATUS

"Graphing Equations" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $60.00 U.S. (1984) from Conduit at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Thereafter, disks may be replaced for $10.00 U.S.

GRAPHING LINEAR FUNCTIONS

DESCRIPTION

Title: Graphing Linear Functions
Author: Mark Berman, Kevin Vessin & Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Mathematics
Topics: Graphing linear functions
Components: 1 diskette, backup, guide (11p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore 64, TRS 80, IBM PC family

Version: 1984
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 9-10

OBJECTIVES

The student will be able to:

1. Change equations in the form of $Ax + By + C = 0$ to equations in the form of $y = mx + b$.
2. Determine ordered pairs of integers which satisfy the equation $y = mx + b$.
3. Plot integral ordered pairs on a cartesian plane.

PEDAGOGICAL CONTENT DESCRIPTION

Following an optional explanation, the user is given the choice of practicing three types of questions:

SECTION 1 - presents the student with a linear equation in the form of $y = mx + b$ and asks for three ordered pairs which satisfy the equation. Each member of the ordered pair must be an integer between -10 and +10. The student then plots the points on a cartesian plane.

SECTION 2 - presents a complex linear equation of the type $Ax + By + C = 0$ and asks the student to manipulate the equation using the properties of additive and multiplicative inverses to get the equation in the form $y = mx + b$. As with the first section, ordered pairs of integers must be found and plotted on the plane.

SECTION 3 - provides the student with a random mix of the first and second sections' problems.

The user may choose to do 1 - 9 problems in each section.

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate for the target audience. While the major concept is the graphing of linear equations, the inclusion of manipulating algebraic equations provides a good review. The sequencing of content is appropriate and students who are using the program as an introduction to graphing of equations should be encouraged to do the sections in order.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of name entry, the option of viewing/bypassing instructions, selecting a section from the menu, entry of numerical, alphabetical or symbolic keys as answer input, using the I, J, K, or M keys to move the cursor as part of the plotting routine, and using RETURN to activate page turns. Feedback is provided after all randomly generated questions. Incorrect responses result in a hint as to why the strategy selected will not work followed by the re-posing of the problem; correct answers result in a short, positive message used in conjunction with the student's name. An error in the plotting coordinates section results in either audio or textual feedback. An error summary is provided at the end of each problem and at the end of a run. Rate and amount (to a maximum of 9) are user controlled; sequence is program controlled in that each problem must be solved using the same problem solving pattern.

INSTRUCTIONAL FORMAT EVALUATION

The drill and practice technique utilized by this program is appropriate for the target audience. Student interaction is consistent and provides effective involvement. Error diagnosis is effective in that it prompts the student without being threatening. Program strength could be improved by allowing the user a second attempt after an incorrect response rather than immediately presenting the correct answer. The audio feedback optionally provided in the plotting help routine is attention getting--indeed, some students may purposely err to activate the audio option. The program progesses in small, incremental steps but, while such developmental sequencing is desirable, high school students may well be prepared to handle larger steps. Since a management system is not provided, teacher supervision of students to check on the number and type of errors being made is required.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in standard size, upper and lower case print. High resolution graphics are used to outline the tables of ordered pairs and to do the graphing. Sound is used as an optional prompt when an error has been made in plotting an ordered pair. The pitch of a steady beeping rises as the cursor nears the correct position and falls as the cursor moves away.

TECHNICAL CHARACTERISTICS EVALUATION

Although the graphing routines are smoothly drawn, some crowding is noticeable. The character set chosen for the representation of fractions is too small and often results in unreadable numerators or denominators. While the audio feedback is effective, it may prove distracting to other classroom members.

SUMMATION

The structured, linear progression of this program is effective in introducing students to linear graphing functions. A lack of variety in the solution methods would cause it to be non-motivational for advanced students.

STATUS

"Graphing Linear Functions" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshop products are carried by Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

INTEGERS/INTEGERS FAST FACTS

DESCRIPTION

Title: Integers[illegible]nteger Fast Facts
Authors: Steket[illegible]ducational Software
Publisher: EduSoft
Source: P. O. Box 2560, Berkeley, California, 94702
Subject: Mathematics
Topics: Operations with integers
Components: 1 disk, guide (2p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS 80

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (415) 548-2304
Users : Elementary/junior high

OBJECTIVES

To provide instruction and timed drills on integer facts.

PEDAGOGICAL CONTENT DESCRIPTION

The disk contains two separate sections, "Integers" and "Integer Fast Facts".

"Integers" provides instruction and drill. The user selects which operation to practice and the number of questions to be done in addition, subtraction, mixed addition and subtraction, multiplication, division or assorted problems. In addition, the student may elect to do the addition and subtraction questions using a number line or access a statement of rules on multiplication or division questions. An optional quiz is also available covering the same operations and with the same features. Ten questions are done and quantitative feedback is given at the end.

There are three parts to "Integer Fast Facts". Each program allows the user to select the operation that is to be practiced (addition, subtraction, multiplication and division). Most of the programs also allow the user to be drilled on an assortment of operations. During the drill, the user (or the users) answer a minimum of 10 questions, each within 10 seconds. Scores are based on accuracy and speed. If the user elects to play the game again, (s)he is encouraged to beat her/his previous high score.

The three programs are:

1. Solo Integer Facts - 10 questions @ 10 seconds per question
2. Team Integer Facts - a team of 2 to 5 members may play the game
3. Competition Integer Facts - students play against a competitor.

PEDAGOGICAL CONTENT EVALUATION

Content range, sequence and depth are all appropriate. The provision of rules, number lines, six different combinations of operations, optional quiz and timed drills make this an excellent package to either introduce students to integers, provide remedial instruction or present periodic review.

INSTRUCTIONAL FORMAT DESCRIPTION

In both sections students enter numerical answers to questions and select from the various options noted above (choice of program, operations, see the rules, work on the number line, continue, redo wrong questions).

Feedback consists of both sound and aural messages. If the answer is correct, the student sees a text message and hears a short beep. Negative feedback varies. In "Integers" the students is given two attempts after which the program works out addition questions on the number line and rules for multiplication/division questions are shown. If an error is made on a subtraction question, the user is first assisted in converting it to an addition question and then feedback follows as above. In "Integer Fast Facts", only one attempt is provided and digits are evaluated upon entry. If the answer is wrong, a buzz is heard and the correct answer is then presented along with another tone signal. Quantitative feedback is given at the end of the drill. In the timed drills, the user is encouraged to beat his/her score which is based on speed and accuracy. In some games, a "half time" score is also given.

Questions are randomized. If an error is made in the timed drills, the student will be given the choice of increasing his/her score by attempting those questions again.

INSTRUCTIONAL FORMAT EVALUATION

In the timed drills, the user is given only one attempt at a question and thus may be penalized for typing errors. (2 digit answers will be counted wrong immediately if the first digit is incorrect.) As this is intended as a speed drill, this feature is not particularly damaging.

The instructional format of the speed drill is generally good within the restrictions of the format. The re-presentation of errors makes this program a "cut above" the other speed drills.

The instructional format of the regular drill is excellent. The availability of using the number line or seeing rules, the excellent feedback for adding and subtracting questions and the provision of a quiz make this program particularly strong.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are presented in large size print. Sound is present but may be turned off at the menu.

TECHNICAL CHARACTERISTICS EVALUATION

The technical design of this disk is good.

SUMMATION

This is an excellent disk. The wide range of options - selecting either specific or mixed operations, determining the number of questions to be attempted, making use of number lines or rules - are all advantageous features. These plus the excellent negative feedback make the disk appropriate for a range of abilities for a very reasonable price.

STATUS

"Integers/ Integer Fast Facts" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from EduSoft at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, diskettes may be replaced for $5.00. EduSoft authorizes the original purchaser of each program to make one backup copy of each program for archival purposes.

Alberta distributors of EduSoft products include Alphatel Computer Products and Edupro Software. Contact the companies directly for price and warranty information (see page v. of the preface).

LEARNING ABOUT NUMBERS

DESCRIPTION

Version: 1983
Display Language: English
Cost: $40.00 U.S. (1984)
Tel. #: (316) 683-6056
Users : Preschool-Grade 4

Title: Learning About Numbers
Authors: Richard Cornelius & Carol Clark
Publisher: C & C Software
Source: 5713 Kentford Circle, Wichita, KS 67220
Subject: Mathematics, Early Childhood
Topics: Counting, telling time, addition, subtraction, multiplication, and division of whole numbers.
Components: 1 disk, user's guide (19p.), keyboard labels, certificate for backup disk
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

OBJECTIVES

"Learning About Numbers" is designed to provide young children with a variety of experiences in working with numbers including practice in counting, telling time, adding, subtracting, multiplying and dividing whole numbers.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains three programs:

LET'S COUNT - This program provides practice in numeral recognition and reinforcement of basic counting skills from one to twelve.

LET'S TELL TIME - After presenting the time on a digital watch, this program asks the student to set the hands on a conventional clock to the same time. Sequenced skill levels lead the student through recognition of time on the hour, half hour, quarter hour and finally to five minute intervals. At the highest level the program provides practice with most of the common idiomatic expressions for telling time.

ARITHMETIC FUN - A graphics "story" is used to provide the setting for practice with arithmetic facts. A prince or a princess (the roles alternate) is locked in a dungeon. The student decides either to help a wicked troll capture the prisoner or to help a hero/heroine get the magic key to rescue the victim. One of the characters moves each time, determined by the child's correct or incorrect responses to the arithmetic question presented.

PEDAGOGICAL CONTENT EVALUATION

Content range and depth are both appropriate for the target audience, although very young students with limited reading ability would undoubtedly need initial adult help in disk operation. The user support materials include keyboard stickers designed to provide guidance for the child who is too young to read. Sequencing is excellent. Each arithmetic program has nine increasingly difficult skill levels. Under normal circumstances, each program starts the child at the easiest level and then adjusts the skill level based upon the child's responses. The amount of practice is open ended with the user determining when (s)he wishes to quit the program. On a subsequent run the user continues from the level previously achieved. The disk also provides the option of an adult being able to set various controls on the program including the level at which to begin, the amount of response time allowed, etc.

The accompanying user's guide provides a concise description of each program, a clear outline of the type of questions encountered at each skill level, and a comprehensive explanation of how to access the management system.

INSTRUCTIONAL FORMAT DESCRIPTION

The student inputs his/her name, decides whether or not instructions are necessary, chooses the program to be run, and presses the return or space bar when necessary. Numerical answers are entered for "Let's Count" and "Arithmetic Fun". Left and right arrow keys are used to move the hands of the clock in "Let's Tell Time". Incorrect responses can be erased with the left arrow key before the return key is used to enter the answer.

Questions are randomly selected at each level and those answered incorrectly are subsequently repeated. The teacher has control over the types of questions presented, the number of questions done, the rate of progression and the type of feedback given.

A graphics display accompanied by sound provides feedback in "Arithmetic Fun" and "Let's Count". The word "correct" accompanied with sound rewards positive responses in "Let's Tell Time". The user is automatically advanced to the next level when mastery is achieved and will be moved back to an easier level if too many mistakes are made. Quantitative feedback (the number of questions attempted, the number answered correctly/incorrectly and an evaluative comment on the student's progress) is presented when the student wishes to end a program.

INSTRUCTIONAL FORMAT EVALUATION

Easy-to-follow instructions are optionally available on the disk. While older students should be able to read and follow these independently, younger students would need initial adult intervention. Effective keyboard labels which correspond to the graphic depictions on the screen allow the student to easily identify the correct key to use. Questions are appropriately randomized within the parameters given in each skill level, and animation and sound are both used to indicate the accuracy of each answer. Control by both the user and the teacher is effective in these programs.

Since mathematical questions are usually introduced in vertical alignment, younger students may become confused with the horizontal arrangement of questions used in this program. Usually the program allows two incorrect responses and then presents the correct answer. Unfortunately remedial help is generally not provided, except for the counting program which provides a demonstration mode which highlights each object as the corresponding number is displayed at the bottom of the screen.

Used in normal mode, the student has complete control over rate and amount, but with the exception of selecting the program to be tackled, sequence is program controlled. The management system however allows an adult the easy option of adjusting the rate (anywhere from 15 seconds to 1 second per response at the highest level) and the initial difficulty level of each program.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics and color are used extensively, upper/lower text is used and sound accompanies all feedback.

TECHNICAL CHARACTERISTICS EVALUATION

This program makes excellent use of color, animated graphics, and sound to interest and motivate the student. Reinforcement is provided in visual form which is appropriate to the target audience. Sound can be adult controlled via the management system as can a number of other features which affect the ease of use of the program. For example, an adult can decide to eliminate the need to have a student type in his/her name if the program is being used with very young children who may not have the necessary spelling or keyboard skills. The program uses high-res graphics for upper/lower case character generation, and standard character generation for numerals. Displays are clear and uncluttered. The student can easily change any answer using the arrow keys, and should reference to instructions be necessary, they can be quickly accessed via the "?" key.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Using the password "Adult", teachers can access class lists. Utilizing this option, teachers can initiate, maintain and add or delete names. Scores are maintained for individual students which provide the number of runs, the number of questions attempted, and the number of questions answered correctly. These can be viewed on the screen or printed in hard copy form. The teacher may determine the entry level for each student, may choose between two mastery levels and can alter the timing between the parameters from 1 to 15 seconds.

Records are automatically updated each time the student ends a program by pressing the escape key. The program will tolerate a student making a typing error when entering his/her name as the computer attempts to make a correct match with names on the class list and asks a question to confirm that it has the right person. Users who have more than one Kid's Corner program may transfer a class list from one disk to another.

IMPLEMENTATIONAL SUPPORT EVALUATION

"Learning About Numbers" has a comprehensive management system which is very easy to use.

SUMMATION

This program combines excellent technical design with effective sequencing to provide interesting drill routines to aid the student in acquiring basic number fact skills.

STATUS

"Learning About Numbers" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $40.00 U.S. (1984) from C&C Software at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, disks may be replaced for $10 upon return of the original disk to C&C Software.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

MATH ACTIVITIES COURSEWARE 3

DESCRIPTION

Title: Math Activities Courseware 3 (MAC 3)
Author: Doug Super
Publisher: Houghton Mifflin Canada Ltd.
Source: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Subject: Mathematics
Topics: Addition, subtraction, counting, estimation, problem solving
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC

Version: 1983
Display Language: English
Cost: $225.00 (1984)
Tel. #: (416) 475-1755
Users : Grade 3

OBJECTIVES

This courseware is designed to engage students in active experiences involving counting; addition, subtraction, multiplication and division skills; number pattern recognition; estimation; congruent figure recognition; and problem solving strategies.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 3's three disks contain 15 games designed to provide drill and practice in basic arithmetic operations:

1. ADDITION NEIGHBOURS: Each player tries to be the first to construct a house by recalling addition facts in a given amount of time.
2. SUBTRACTION BRIDGES: Students are given 30 seconds to solve a simple subtraction problem. If the student has not entered the correct answer within 10 seconds, a "bridging with 10" help strategy is automatically invoked for the remaining 20 seconds.
3. COUNTING PATTERNS: The player, presented with a grid which contains incomplete number patterns, attempts to replace four of the blank spaces with the correct number sequence before being eaten by a monster.
4. THE 100 RACE: Players compete to win a race by adding a running total to 100.
5. SHIFTY EYES: Students are required to recognize numbers which require regrouping in subtraction and then complete the operation.
6. BEFORE AND AFTER: Given a clock, students must tell what time it will be in a certain number of minutes after the time depicted.
7. RAISINS AND MARBLES: The player is given a story problem containing extraneous information. The relevant data must be selected and used in a complete sentence and in a multiplication equation.
8. BERTHA EATS BASIC FACTS: The student attempts to discover a secret divisor (involving the numbers 2, 3, 4, and 5) by feeding "Bertha" numbers to divide and watching the effect upon the answer.
9. WE'VE GOT REALLY BIG PROBLEMS: The student is given a 3 digit addition question which increases in length (to a maximum of 999) as the student continues to add correctly.
10. LILY PADS: A minuend, 3 possible subtrahends, and the difference are presented on the screen. The player wins lily pads as (s)he identifies which subtrahend is the correct one.
11. SLIDING TWINS: The player tries to match four pairs of congruent figures in a 10 x 5 grid.
12. MATCH A FACTOR: Given a product, the student has to guess what two factors (between 0 and 9) were used to achieve that product.
13. REMAINDER TAKE-OUT: The player starts the game with a set of numbers, 1 to 8, in his/her hand. Given a random divisor the player chooses a dividend which, when divided, will result in a remainder which matches one of his/her numbers.
14. WE'RE COUNTING ON YOU: The player must fill in a skip-counting pattern involving decimals.
15. MISSING NUMBERS: In this combination word/multiplication game, the player solves a multiplication problem and thus reveals letters for a hidden word.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User suport materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

PEDAGOGICAL CONTENT EVALUATION

The content and sequence of these drill and practice programs are appropriate for the target audience. Depth in some of the programs is limited--for example the division activity uses only the divisors of 2, 3, 4 and 5. Although the programs would supplement any authorized Grade 3 text provided the suggested lead-up activities are employed, they are specifically designed to supplement the Houghton Mifflin Grade 3 mathematics textbook. When used in combination with classroom instruction and in conjunction with the support materials provided, this courseware fulfills its stated objectives. All program content is accurate and free of bias.

INSTRUCTIONAL FORMAT DESCRIPTION

Each game requires the student to demonstrate mastery of the skill mentioned in the objectives, to think of several possible answers to the randomized questions posed, and then to enter the answer that will be most likely to result in a successful turn. Feedback usually combines text, graphics and sound. Sequence of presentation is program controlled; rate and amount are both user and program controlled.

INSTRUCTIONAL FORMAT EVALUATION

Interaction is consistent and readability is appropriate to a grade 3 audience. Game structure is both unique and imaginative and effectively reinforces classroom teaching. A few of the games are timed--this serves to heighten student motivation and interest and to quicken response time. Students can compete with the computer or with other students and are encouraged to watch the responses of their opponent attentively in order to plan effective strategy for their next move. Feedback is immediate, non-threatening, and motivational; however, it is often non-corrective. Furthermore, no evaluations or branches are available. While limited help avenues are available, they may present an alternative method of solving a problem which may confuse and complicate the issue for the weaker student for whom the help avenues are designed.

The disk instructions are often difficult to understand, thus teachers must be prepared to devote time to assisting students in the playing process.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are an essential component of the programs. Color is used, but a color monitor is not mandatory. Sound can be teacher-disabled.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are appropriate and effective, text is clear and easy to read, and transition from one display to the next is smooth. Optional sound complements each program. In consideration of the young target audience, a larger character size in the instructions and in some of the displays (e.g. the numbers on the clock in "Before and After") may be appropriate. Occasionally the graphics used tend to distract from the program in that they provide too much "screen clutter" (e.g. Subtraction Bridges) or they have little or nothing to do with the concepts being taught (e.g. Addition Neighbors).

The program is well bomb-proofed in that all keys unnecessary to game operation are disabled, however the program does not always recognize equally correct alternatives. For example, "Raisins and Marbles" will not recognize the commutative principle in that "2 x 3 = 6" is considered correct however "3 x 2 = 6" is considered incorrect. Some time constraints prove too limiting for young students. For example, in "Lily Pads" the student does not have time to organize his/her estimation skills before the frog disappears, so instead (s)he resorts to actual subtraction, thus defeating the purpose of the program.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 62 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strengths of this package are the abundance of practice it provides in basic mathematical operations and its general motivational and interesting instructional approach. Teachers will need to assist students having difficulty as only limited feedback is provided and some problem solving activities may prove to be challenging to weaker students.

STATUS

"Math Activities Courseware 3" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $225.00 (1984) from Houghton Mifflin at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes. Diskettes which become inoperable through normal use may be returned and replaced for $15. There is no time limit for this warranty.

Each diskette is capable of operation with more than one machine at a time if only one activity is accessed. However, use of the diskettes is subject to copyright laws and any license or purchase agreement.

MATH ACTIVITIES COURSEWARE 4

DESCRIPTION

Title: Math Activities Courseware 4 (MAC 4)
Author: Doug Super
Publisher: Houghton Mifflin Canada Ltd.
Source: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Subject: Mathematics
Topics: Logic, problem solving, decimals, estimation, ordering, operations with whole numbers, making change
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC

Version: 1983
Display Language: English
Cost: $225.00 (1984)
Tel. #: (416) 475-1755
Users : Grade 4

OBJECTIVES

This courseware is designed to engage students in active experiences involving estimation, problem solving strategies, and concept development.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 4 contains 15 programs designed in a game mode. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the Houghton Mifflin Mathematics textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

The games are:

1. NUMBER LADDERS: The user arranges numbers containing 1-5 digits in ascending order.
2. CATCH A FALLING STAR: The object of this timed game is to 'catch a falling star' by correctly answering simple addition/subtraction questions. Three questions are posed at a time from six different types of equations with the winner achieving the most number of correct answers over 25.
3. MASTER MATH: The player enters a subtraction or addition question with up to four digits in the answer. The object is to guess all of the digits in the opponent's question.
4. PIGGY BANK: The student selects the appropriate coins to make a monetary value after the computer specifies the total amount and the number of coins to be used (not necessarily the most efficient number of coins). This is a timed competition where an incorrect guess allows the opponent to continue solving the question.
5. TIMES TEASER: Students fill in the blanks in a 5x5 times-table grid where the factors have been rearranged. This is a timed competition over two levels of difficulty ((1-5) x (1-5) or (1-5) x (5-9)).
6. ALLITERATION: Students enter a test sentence containing 15-39 letters with each word beginning with the same letter. They then attempt to uncover all the letters in their opponent's sentence by answering a simple multiplication or division equation associated with each letter they guess.
7. FRACTION CLUES: Users determine if a fraction is greater than, less than or equivalent to another. This is a timed exercise where a series of graphical or numerical clues are given as the student delays answering.
8. MT. MULTIPLICATION: Students climb a mountain by correctly answering multiplication questions (1x1 horizontal, 2x1 horizontal or 3x1 vertical). Successful completion of a question allows the user to specify his/her next movements up/across the mountain so as to avoid hidden obstacles.
9. REMAINDER CLUES: Using clues such as "N : 4 R1", a student competes against an opponent in attempting to discover a number in a counting sequence of 30 numbers. This is a timed competition where the user may enter a guess or accept another clue in each of his/her turns.
10. AREA ESTIMATION: The user attempts to estimate the area of a rectangular or L- shaped figure. This is a timed competition where the student attempts to come as close as possible to the correct answer without exceeding it.
11. GREEN BANANAS: In this competition, students try to get their baboon up a tree the fastest by correctly solving a division question using Greenwood's method of successive subtraction. Single digit divisors and three digit quotients are used in the questions which have no remainders.

12. FIGURE FAST: In this timed contest, students identify congruent geometric shapes from a display of sixteen, two dimensional figures.

13. COORDINATES CONCENTRATION: Students play a 'concentration' game to reveal and capture letters hidden on a 6x6 grid (positive numbers).

14. DECIMAL RALLY: The object of this game is to park a vehicle within six decimal intervals from 0 to 10. This is achieved by adding or subtracting one or more of 8 decimals (expressed to the hundredths place) to the previous answer.

15. ASTEROID ACE: Students guide a rocket ship through an asteroid field by correctly estimating 3 digit by 2 digit multiplication questions. The object is to answer as many questions as possible within a time limit. Students may choose to have the questions move at one of five different speed levels.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

PEDAGOGICAL CONTENT EVALUATION

The content range, sequence and depth of the total package are appropriate to the target audience; however, while the content of the full series is appropriate, there are weaknesses in some of the individual games.

In "Mt. Multiplication", the main skill is in mapping one's way around the obstacles. While this may be beneficial, grade four students who tried it required an excessive amount of time to complete it and soon lost interest.

The content in "Asteroid Ace" may be beyond many grade 4 students and even better students found "Decimal Rally" to be extremely challenging.

The content and the time limit in "Remainder Clues" make it extremely difficult as the student first has to interpret the clue and then delete appropriate numbers from the list of numbers. There does not appear to be sufficient time just to do the paperwork, let alone the time needed to interpret the clue and form conclusions. This game is doubly frustrating if played against the computer, as it is not unusual to have the computer win in three moves when the student requires a minimum of four.

Another time related problem may exist in "Area Estimation" as the numbers are too large and the program does not give the user sufficient time to even determine the factors that are to be multiplied. While there may be some value in promoting the "intuitive guesswork which is cultivated through extensive experience", there is also a frustration index to be considered.

It should not be assumed that all programs with time limits are weak. "Catch a Falling Star" and "Figure Fast" are appropriately timed as the content is basically quick recall of previously learned facts. Where the use of time limits is questionable is in those programs which require problem solving skills as many students will find these hard enough to master without having the added pressure of a time limit. It would have been advantageous to make the time limits optional and/or adjustable. This would have provided a sequence from easy to difficult, an ingredient which is missing from almost all of the contests.

In summary, while the content of the full three disks is appropriate and effectively presented, there are some concerns about the appropriateness of some of the games. Whether or not students encounter those difficulties is to a large extent dependent upon how they are prepared. These activities are intended to be presented after classroom instruction and, as such, the concerns raised above may prove to be unwarranted. It should be noted that the support information provides excellent resources for extension activities or as parts of lessons leading up to the computer activities.

INSTRUCTIONAL FORMAT DESCRIPTION

Interaction with the computer consists of menu selections, the designation of the number of players as well as a wide variety of answer inputs including numerical values, letter values, arrow keys, and +, - and space bar keys. Inappropriate keys are frozen. Interaction within the group in discussing strategies can be productive and is encouraged.

Questions are generated randomly. Feedback techniques vary from one program to another but almost all are presented graphically with the use of sound.

INSTRUCTIONAL FORMAT EVALUATION

Interaction is consistent and readability is appropriate to a grade 4 audience. Game structure is unique, imaginative and stimulating. Students participate actively and can compete with other students or with the computer, thus heightening motivation.

The non-threatening and immediate feedback is very appropriate. Graphics, text and sound are all used to advantage. However, it should be noted that no help or explanation is given for incorrect answers. Students having difficulty with the concept or with the strategies involved may find certain games frustrating. As there are no explanations on how to play the games on the disks, students who are playing a game for the first time may also be frustrated. This should not be a problem if the class is introduced to each program ahead of time as would be appropriate to the intent of the package.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are an essential component of the programs. Color is also used but a color monitor is not essential. Sound is optional and is controlled by the teacher. The student may 'escape' and return to the menu at any time.

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is excellent. Students may have initial difficulties with the clarity of some text and the crowded displays in some games but these disappear with use. Optional sound complements each program. The program is well bomb-proofed in that all keys unnecessary to game operation are disabled. Note that sound and the appearance of a program in the menu is teacher controlled.

A number of minor problems are evident. At times the answers have to be entered slowly, (e.g. "Alliteration") and the positive reinforcement in "Times Teaser" is overly repetitive and irritating.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 62 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strengths of this package are the abundance of practice it provides in estimation and problem solving activities and its effective use of graphics and sound to motivate students.

It is possible that some of the content, through the design of the activity and/or the presence of time limits, may be inappropriate for some of the audience. As a result, parts of the package may be more appropriate for students in grade 5. Also teachers will need to assist students having difficulty as only limited feedback is provided and some problem solving activities may prove to be challenging to weaker students.

The game format is excellent, however, in motivating students. The teacher's manual is also excellent and the design of the programs in promoting thinking outweigh the potential disadvantages.

STATUS

"Math Activities Courseware 4" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $225.00 (1984) from Houghton Mifflin at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes. Diskettes which become inoperable through normal use may be returned and replaced for $15.00. There is no time limit for this warranty.

Each diskette has the advantage of being capable of operation with more than one machine at a time if only one activity is accessed. However, use of the diskettes is subject to copyright laws and any license or purchase agreement.

MATH ACTIVITIES COURSEWARE 7

DESCRIPTION

Title:	Math Activities Courseware 7 (MAC 7)	**Version:**	1983
Author:	Doug Super	**Display Language:**	English
Publisher:	Houghton Mifflin Canada Ltd.	**Cost:**	$250.00 (1984)
Source:	150 Steelcase Road West, Markham, Ontario, L3R 1B2	**Tel. #:**	(416) 475-1755
Subject:	Mathematics	**Users :**	Grade 7

Topics: Estimation, decimals, problem solving, whole numbers, flow charts, order of operations, LOGO

Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)

System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable

Other Formats Available (not evaluated): Commodore 64, IBM PC

OBJECTIVES

This courseware is designed to engage students in active experiences involving estimation, problem solving strategies and concept development.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 7's three disks contain 18 games designed to provide drill and practice on the following topic areas:

1. DECIMAL DYNAMITE: Six decimal addition problems are displayed at the bottom of the screen. Students use the arrow keys to line up the answer, displayed in a descending dynamite stick at the top of the screen, with the appropriate problem.
2. THE LAST MOVE: Designed to reinforce skill in decimal comparison and to focus attention on place value concepts and manipulation, this program presents two 4-digit numbers which the user must increase or decrease by multiplying or dividing by 10 or by exchanging two digits.
3. GUESS AND TEST: The user is presented with a word problem for which (s)he must guess a solution within an allotted time. The computer tests the solution and gives appropriate feedback to help the user refine his/her guess.
4. MULTI-MASTER: Each player supplies a multiplication question made up of a 3-digit and a 2-digit number. The object is to guess the other player's number by guessing digits which may be either in the question or in the solution.
5. CHARTING THE FLOW: A numerical word problem is presented which requires a flow chart solution. The user is required to select the correct flowchart action (assign, decide, input, output) and further details such as a variable list, a conditional, etc. Correct decisions are awarded 10 points; incorrect decisions result in a loss of turn.
6. CALCULATOR QUIZ: Given a mathematical expression, the student uses the M+, M-, MR, C and numeric keys to solve the problem, using the computer as a calculator.
7. METRIC MYSTERIES: A geometric figure is covered by tiles labelled A to I. In turn, each player removes one of the tiles and attempts to estimate the area of the figure. An estimate within two square centimeters of the actual area wins the game.
8. LITTLE LOGO: This program begins with an optional introduction to Logo. Students are then given four sections of commands (Command, Edit, Trace/Run, and Disk Operation Menus) from which programs can be developed.
9. REMAINDER CLUES: Students are given thirty 2 or 3-digit numbers displayed in sequence, one of which is a mystery number. Given the clues of a divisor and a remainder, students apply pattern finding strategies to identify the mystery number.
10. ANIMAL FARM: Given a pen containing two types of animals, students must add or subtract animals from the pen in order to achieve the proportion of animals requested.
11. FRACTION CHALLENGE I: Nine numerals are listed at the top of the screen in ascending order. In turn, two players try to correctly place the numerals in three fraction addition/subtraction problems (expressed in lowest terms) from which they have been removed.
12. FRACTION CHALLENGE II: Nine numerals are listed at the top of the screen in ascending order. In turn, two players try to correctly place them in three multiplication/division problems (expressed in lowest terms) from which they have been removed.

13. **NUMBER PATTERNS:** Given two numbers, players are challenged to determine the next number in the sequence. A clue is provided at the end of each turn.

14. **PIE GRAPHICS:** A circle graph is cut into five inequal slices. Players estimate the percent each slice is of the whole. The first player to "capture" three slices (i.e. be correct within 2%) wins.

15. **CONGRUENT FIGURES:** The user is presented with a triangle and is requested to produce a congruent triangle on a grid by giving three ordered pairs. If successful, five extra points can be earned if the player is able to plot a reflection of that triangle across a reflection line.

16. **HIT OR MISS:** Designed to act as a probability demonstration and strategy activity, in this program a randomizing device simulates a spinner of two colors distributed among 10 equal sections. The player must predict the number of trials which would be required for all the experimental ratios to fall close to the probability value.

17. **OPERATION INTEGER:** Each player attempts to be the first to land a simulated space ship on 3 of 5 supply ships by adding or subtracting integers on a coordinate plane.

18. **CONNECT THE POINTS:** Players are given up to four ordered pairs that obey one of the following linear relationships: $Y = X + N$, $Y = X - N$, $Y = X/N$, $Y = N \times X$. Within four tries, players attempt to supply the value of N that would be required.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

PEDAGOGICAL CONTENT EVALUATION

The content, sequence, and level of difficulty are appropriate to the target audience; however, some programs (e.g. "Guess and Test") may be best suited for use with advanced students. All program content is metricated.

Although the programs can support any authorized Grade 7 text provided that the suggested lead-up activities are employed, they are specifically designed to supplement the Houghton Mifflin Grade 7 mathematics textbook. The games can be chosen in any sequence and are designed to review, reinforce, enhance, and practice the operations and concepts taught by the teacher in the classroom. When used in combination with classroom instruction and in conjunction with the support materials provided, this courseware fulfills its stated objectives admirably.

INSTRUCTIONAL FORMAT DESCRIPTION

Each game requires the student to demonstrate mastery of the skill mentioned in the objectives, to think of several possible answers to the randomized questions posed, and then to enter the answer that will be most likely to result in a successful turn. Feedback usually combines text, graphics and sound. Sequence of presentation is program controlled; rate is both user and program controlled.

INSTRUCTIONAL FORMAT EVALUATION

Interaction is consistent and readability is appropriate to a grade 7 audience. Game structure is both unique and imaginative. A few of the games are timed and this combined with a visible, ever-changing scoreboard serves to heighten both student motivation and interest. Students can compete with the computer or with other students and are encouraged to watch the responses of their opponent attentively in order to plan effective strategy for their next move. Feedback is immediate, non-threatening, and very motivational and encourages student interaction with one another. Students participate actively and can compete with other students or with the computer, thus heightening motivation.

Some minor problems are:

1. Evaluators noted that "Charting the Flow" does not accept correct but alternate forms of responses.
2. Although correct responses are almost always provided as part of the feedback, the problem solving process is unfortunately provided on only a few programs.
3. The disk does not provide operating instruction--this may frustrate initial users.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics are an essential component of the programs. Color is used, but a color monitor is not mandatory. Sound can be teacher-disabled.

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is excellent. Displays are appropriate and effective, text is clear and easy to read, and transition from one display to the next is smooth. Optional sound complements each program. The use of both standard text size for general comments and large size text for important numbers or concepts adds effective emphasis. The program is well bomb-proofed in that all keys unnecessary to game operation are disabled.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 62 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strengths of this package are the abundance of practice it provides in estimation and problem solving activities and its effective use of graphics and sound to motivate students. Since the disks do not contain instructions on how to play the games, prior classroom preparation is essential. Also teachers will need to assist students having difficulty as only limited feedback is provided and some problem solving activities may prove to be challenging to weaker students.

STATUS

"Mathematics Activities Courseware 7" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $250.00 (1984) from Houghton Mifflin at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes. Diskettes which become inoperable through normal use may be returned and replaced for $15.00. There is no time limit for this warranty.

Each diskette has the advantage of being capable of operation with more than one machine at a time if only one activity is accessed. However, use of the diskettes is subject to copyright laws and any license or purchase agreement.

MATH ACTIVITIES COURSEWARE 8

DESCRIPTION

Title: Math Activities Courseware 8 (MAC 8)
Author: Doug Super
Publisher: Houghton Mifflin Canada Ltd.
Source: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Subject: Mathematics, Problem Solving
Topics: Estimation, problem solving, logic, decimals, fractions, percents, square roots, geometry
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (78p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC

Version: 1983
Display Language: English
Cost: $250.00 (1985)
Tel. #: (416) 475-1755
Users : Grade 8

OBJECTIVES

This courseware is designed to engage students in active experiences involving estimation, problem solving strategies and concept development.

PEDAGOGICAL CONTENT DESCRIPTION

MAC 8's three disks contain 18 games designed to provide drill and practice on the following topic areas:

1. THE THREE M'S - students are shown various bar graphs and are asked to estimate the mean, median or mode.
2a. POWER PATTERNS - students attempt to determine the base and exponent of a number.
2b. CLOSING IN - a timed activity designed to improve estimations of decimal multiplication and division.
3. NUMBER LINE HOPE - a strategy activity involving the multiplication and division of integers.
4. RUBI-QUATIONS - a logic activity involving basic facts in which players, assigned a target number position, attempt to reach it by dividing their number by any integer from -9 to 9 in a series of turns.
5. LOOP THE LOOP - provides practice in "Print" and "For...Next" statements by solving BASIC programming puzzles.
6. NUMBER STUMPER - a logic activity involving common and prime factors, multiples and common multiples.
7. OPERATING WITH FRACTIONS - a timed drill involving basic operations with fractions.
8. ECKSES AND OHZS - provides practice in solving simple equations (1 variable) with the minimum 2 operations.
9a. RATIO RENDEZVOUS - provides drill in estimating, calculating and identifying equivalent ratios. .
9b. PULLING PERCENTS - timed exercises in identifying equations which lead to the solution of a percent problem.
10. SQUARE ROOT CHASE - practice in estimating the square root of decimals (up to six decimal places)
11. TRIANGLE TRYOUTS - a geometry activity involving triangle construction, calculating the angles and lengths of sides, and working with the rules of congruency SSS, SAS, and ASA.
12. METRIC MYSTERIES - a measurement activity involving calculating the areas of triangles, quadrilaterals, and irregular "L" and "U" shaped figures.
13. TRANSFORMATIONS - an activity involving the skills of translations, rotations, reflections, and dilatations.
14. EQUATION DARTS - a graph estimation activity involving the solution of equations with two variables.
15. PROBABLE URN-INGS - a probability activity practice in working with independent and dependent events based on drawing marbles from an urn or guessing its contents.
16. THE GAME OF LIFE - a simulation involving experimentation and investigation. Players are given the opportunity to place life forms on a graph and by applying the three rules of life (birth, survival, and death), see the resulting generations.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

PEDAGOGICAL CONTENT EVALUATION

The content, sequence and level of difficulty are appropriate to the target audience; however, some programs (e.g. Loop the Loop) may be best suited for use with advanced students. All program content is metricated.

Although the programs can support any authorized Grade 8 text, they are specifically designed to supplement the Houghton Mifflin Grade 8 mathematics textbook. The games can be chosen in any sequence and are designed to review, reinforce, enhance and practice previously taught operations and concepts. When used in combination with classroom instruction and in conjunction with the support materials provided, this courseware fulfills its stated objectives admirably.

INSTRUCTIONAL FORMAT DESCRIPTION

Each game requires the student to demonstrate mastery of the skill mentioned in the objectives, to think of several possible answers to the randomized questions posed, and then to enter an appropriate answer. Inputs may be single letters or words. Feedback usually combines text, graphics and sound.

INSTRUCTIONAL FORMAT EVALUATION

The readability is appropriate to a grade 8 audience. Optional game instructions occur at the beginning or each activity. Game structure is both unique and imaginative. A few of the games are timed and this serves to heighten both student motivation and interest. (Unfortunately the instructions do not always indicate that the game will be timed.)

Students participate actively and can compete with other students or with the computer, thus heightening motivation. They are encouraged to watch the responses of their opponent attentively in order to plan effective strategy for their next move. Feedback is immediate, non-threatening, and very motivational and encourages student interaction with one another.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are an essential component of the programs. Color is used, but a color monitor is not mandatory. Sound can be teacher-disabled. A few of the programs use inverse flashing and scrolling.

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is excellent. Displays are appropriate and effective, text is clear and easy to read, and optional sound complements each program. The use of both standard text size for general comments and large size text for important numbers or concepts adds effective emphasis. The program is well bomb-proofed in that all keys unnecessary to game operation are disabled.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

A teacher management system enables teachers to use/disable sound and to control student program selection. A 78 page instructor's guide contains student worksheets, provides program operating instructions, suggests alternate classroom activities, and outlines specific objectives for each program.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management system is easy to access and use. Documentation is well organized and following its guidelines results in easy implementation. The worksheets are closely linked with the computer programs and provide a good record of student progress.

SUMMATION

The major strengths of this package are the abundance of practice it provides in estimation and problem solving activities and its effective use of graphics and sound to motivate students. The programs offer drill and practice only, therefore prior classroom instructional preparation is essential. Also teachers will need to assist students having difficulty as only limited feedback is provided and some problem solving activities may prove to be challenging to weaker students.

STATUS

"Mathematics Activities Courseware 8" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $250 (1985) from Houghton Mifflin at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period. Diskettes which become inoperable through normal use may be replaced at any time for $15.

MATHEMATICS: LEVEL D (Managed)

DESCRIPTION

Title: Mathematics: Level D (Managed versions)
Authors: Science Research Associates & WICAT Inc.
Publisher: Science Research Associates (Canada) Ltd.
Source: 707 Gordon Baker Road, Willowdale, Ontario, M2H 2S6
Subject: Mathematics
Topics: Whole number computation, fractions, decimals, ratio, percent, measurement, pre-algebra, applications
Components: 4 management diskettes, guide (52p.) and 10 program diskettes
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor, take out 80 col. board for print options
Other Formats Available (not evaluated): Atari 800

Version: 1983
Display Language: English
Cost: $800.00 (1984)
Tel. #: (416) 497-7707
Users : Grades 7-9

OBJECTIVES

To provide drill and practice in major arithmetic skills for grades 7-9

PEDAGOGICAL CONTENT DESCRIPTION

COMPUTATION D: There are 23 lessons on this disk covering multiplication and estimation in multiplication, division and estimation in division and some mixed practice in whole number operations.

NUMBERS and NUMERATION: The 20 lessons on this disk give the user practice in the concepts of numeration. These topics include place value, comparing two numbers, translating words into numerals and vice versa, rounding, writing products as a power, scientific notation, divisibility rules, prime/composites, prime factorization, greatest common factors, least common multiples, square roots and square root tables.

FRACTIONS: This disk contains 20 lessons that encompass all the concepts in fraction manipulation and computation. These include comparisons, conversions, equivalence, common denominators and fundamental operations.

DECIMALS: The 22 lessons on this disk begin with questions on the concept of decimals (e.g. region diagrams), and advance to exercises on changing decimals to fractions and vice versa, place value, rounding, decimal operations and multiplication and division by multiples of 10.

RATIO and PERCENT: The content is covered in forty lessons on two diskettes. Students begin with practice in understanding what a ratio is and proceed to exercises on solving proportions, converting fractions and decimals to percents and vice versa and solving three types of percentage questions.

MEASUREMENT: There are 42 lessons on two disks. The first 18 lessons include estimating, selecting and converting units of measure and adding and subtracting units of measure while lessons 19-23 cover reading a ruler, thermometer and speedometer. The remaining lessons present exercises on perimeter and area of polygons (rectangles, parallelograms, triangles and trapezoids), circumference and area of circles, surface area of rectangular prisms, and volumes of rectangular prisms, triangular prisms, rectangular pyramids, cylinders, cones and spheres. Measurements include both imperial and metric units.

PRE-ALGEBRA: There are 22 lessons on this disk covering the following topics: simplifying numerical expressions, translating phrases into expressions, evaluating expressions, translating sentences into equations, solving 1 and 2 step equations, integer computations, solving equations with integers, plotting and identifying coordinate points and solving 2 variable equations through use of a table.

APPLICATIONS: This disk contains 19 lessons on consumerism. They deal with unit pricing, sales tax, utility bills, installment financing, pay cheques, banking, mileage charts, maps and reading various types of graphs.

Throughout the series, four to ten questions are presented in a practice session. No instruction is provided but the student has the option of requesting 'help' in the form of a tutorial at any part of the program.

The lessons on the disks are generally developmental and students progress through levels based upon performance. A demonstration of mastery results in advancement while failure results either in a second attempt or in regression to easier levels.

PEDAGOGICAL CONTENT EVALUATION

The sequencing is generally very good with most topics related and ordered from easy to difficult. The student is managed through the sequence so that mastery of a skill is required before advancement and students who have difficulty are regressed to easier content. As the content is very finely sequenced, most students will be able to proceed with success.

Students may have unlimited amount of practice and 'help'. This help includes definitions, examples and step by step solutions and is accessed whenever the student desires it. The help session may be inappropriate for students who are very weak in the skill or have poor reading ability. This should not, however, be a problem if the sequence is followed properly or if the teacher monitors student progress regularly. Note also that pre-testing is possible.

SI metric is not followed completely. Some numbers have commas, "meter" is spelled as 'metre' and imperial units are used extensively in the measurement and applications disks. The applications disk is further weakened due to Americanization of the content.

Generally speaking and considering the scope of the series, the content is excellent.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entering numerical answers in parts or in their entirety, answering multiple choice questions, moving the cursor and/or requesting help. Students are given one attempt at the randomly generated questions.

Feedback is given by happy faces or X's in boxes at the bottom of the screen. The boxes also indicate the number of questions in the drill. An "OK" and an optional audio "beep" also appear with correct responses, while a "NO" appears with errors. To see the correct answer students have to access the 'help' branch. Quantitative results and a recommendation on future work appear at the end of each drill.

An option available to the teacher is the use of the "practice mode" as a test to help the teacher determine which level a student should begin his/her work on each operation.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design of this package is sound. Interaction with students is effective, particularly as the student can work out most questions on the screen and the keyboard is frozen to guard against accidental input. The value of the 'help' session is considerably increased through the high degree of student interaction.

The feedback is consistent, relevant and immediate although limited in variety. Unfortunately students are given only one chance at responding to a question and the correct answer is shown only if the 'help' session is accessed. This could be frustrating to students who want only to see the answer or it could be a problem if weak students do not elect to see the help. It may be more appropriate to show the correct answer after mistakes and to automatically send the student to the tutorial after x number of errors. The provision of this branch, however, is an excellent addition to a drill program.

Questions are randomized effectively although successfully answered questions occasionally can reappear.

While the feedback is somewhat weak, the provision of a help branch and the good student interaction are both strengths that make the instructional format of the series quite good.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are generated in large size, upper and lower case high resolution graphics. An audio "beep" is optional, special features such as animation and inverse mode are present in some tutorials and high resolution graphics are used to show tables and grids, occasionally with color.

TECHNICAL CHARACTERISTICS EVALUATION

The package is well designed. Numbers and letters are large and easy to read and the program, with the exception of the generation of some of the detailed graphics, moves along at an adequate pace. It may be appropriate to keep pertinent graphics on the screen, e.g. square root tables, rather than clearing and then redrawing. Although the programs are generally friendly, reliable and consistent, some instruction to students is required regarding the special function of some keys.

While student motivation may not be a problem due to the high probability of success in the drills, the slow speed of some programs and the similarity to a series of printed drill sheets may deter some students. There are few if any motivational tools used and this is one area that some evalutors felt could be improved upon. Other evaluators felt that brief daily sessions would not lead to boredom and 'frills' were unneeded.

IMPLEMENTATIONAL DESCRIPTION

Management options available to the teacher include:

1. Edit user records, e.g. add, delete or list users, lock/unlock lessons.
2. Edit curriculum options, e.g. add, delete units.
3. Edit teacher options, e.g. change passwords, audio feedback.
4. Print reports; five reports are available on the screen or in hard copy. These are: individual student reports, class list reports, graphic class reports (progress of the class within a unit), student positive report (% of lessons completed, comparison to class average), and unit enrollment reports (names of students in a unit).
5. Print seatwork; up to 99 exercises can be generated on the printer.

Options available to the student include:

A. Placement mode: A pre-test for a student entering a content area for the first time which will determine the beginning lesson.

B. Progress mode: A score of 80% or more on a drill moves the student to the next drill. Scores of 50%-79% result in repetition of the drill. A failing mark (less than 50%) requires the drill to be repeated and a second failure results in regression to a previous lesson.

C. Practice mode: The work is recorded but the student's standing is not affected as in the progress mode.

A maximum of 150 students may be entered (50 per data diskette). Users are listed alphabetically on each diskette. Note that the print options do not work with the Apple IIe if the 80 column board is in place.

IMPLEMENTATIONAL SUPPORT EVALUATION

The management package, although complex, is user friendly and would require about one hour to learn. It provides accurate and detailed records of student performances at all times.

The need to frequently exchange diskettes could be overcome if a dual drive version was available. The retrieval of student records is slow and this becomes worse as more students and more student scores are entered on a data diskette. As the loading and recording waits can become significant, many student data diskettes would be needed for effective use in a classroom.

SUMMATION

Apart from some problems in disk handling with the management system, the overall package is excellent. Disks will vary slightly in quality and some teachers may find the approach used to practice a particular skill is less than what they would have desired. However, the overall quality of the ten disks is excellent, particularly in the scope and sequence of the content and the help available to the student who makes an error. Other advantages are the frequent user interaction, the clarity of the displays and the automatic progression/regression. Weaknesses include the negative feedback (no presentation of the answer and non-automatic access to the help branch), provision of one attempt only, the slow generation of some graphics and the incomplete metrication. The most serious limiting factor for classroom use however is the price which may prove to be prohibitive.

SRA's "LEVEL D" presents quality drill and practice exercises covering a wide range of topics in one package. Weaknesses noted above should be measured against the very strong benefits that the excellent content scope and sequence will provide with regular use.

STATUS

"Mathematics Level D" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $800.00 (1984) from Science Research Associates at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter diskettes may be replaced for $20.00.

As disk access is frequent, use of a disk is limited to one computer at a time.

MATH STRATEGIES: PROBLEM SOLVING

DESCRIPTION

Title: Math Strategies: Problem Solving
Publisher: Science Research Associates (Canada) Ltd.
Source: 707 Gordon Baker Road, Willowdale, Ontario, M2H 2S6
Subject: Mathematics
Version: 1983
Cost: $210.00 (1985)
Tel. #: (416) 497-7707
Users : Grade 6+
Topics: Using calculator; simplifying problems; problem breakdown; choosing information; using models; challenges
Components: 2 disks, teacher guide (28p.), 20 student texts (108p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS 80 Model III

OBJECTIVES

This program is designed to provide instruction and practice in solving multiple-step problems using four problem solving strategies: simplifying a problem, breaking a problem into parts, identifying needed additional information, and making a model of the problem.

PEDAGOGICAL CONTENT DESCRIPTION

This program, on two disks, consists of sixteen problem settings designed to help students use the four problem solving strategies. Each problem setting consists of many problems. The students are given an introductory problem which they try to solve at the computer with "help" being provided when needed or upon request. The student is then encouraged to solve derivative problems, based on the introductory problem, until they no longer require help. The program consists of the following six chapters:

1. USING THE CALCULATOR: Each computer problem has a built-in calculator. The numbers and symbols that are entered remain displayed on the screen and the student can view a complete sentence when the calculation is completed. The calculator is used to perform a variety of operations with whole numbers, decimals, percents and fractions.
2. SIMPLIFYING PROBLEMS: Students are to solve problems by substituting easier data for the given data. This involves estimating before making actual calculations. These problems begin with one-step problems and then move to multiple-step problems.
3. PROBLEM BREAKDOWN: This chapter provides practice in solving multiple-step problems by breaking them down into smaller parts and solving each part.
4. CHOOSING INFORMATION: Students choose information needed to solve multiple-step problems from a list containing extraneous information.
5. MODELS: Students use pictures and charts to solve multiple-step problems.
6. CHALLENGE PROBLEMS: Students will solve more difficult multiple-step problems using the strategies of chapters 2-5. This includes evaluating expressions containing more than one operation, with or without parentheses, writing math sentences for the problems, using the calculator to find powers of numbers and changing numbers written in scientific notation or e-notation into standard form. Most of this chapter is for more advanced students.

PEDAGOGICAL CONTENT EVALUATION

The content range and sequence is appropriate for most of the target audience; however, some of the content may be too difficult for grade six students. The sequencing is from easy to difficult with appropriate sized increments. The user can enter into the sequence at intermediate steps. The depth of the program is appropriate and effective in achieving the intents of the program. The student has ample opportunity for practicing the skills. Definitions and explanations (HELP) are available whenever required. This assistance is effective and adds considerably to the strength of the program.

The content is presented in a clear and concise manner. It is noted that not all of the content is metricated and there are some problems which focus on the United States; however, this does not preclude the use of this program.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, multiple choice entry, and input of calculations and answers. The student has the option of using the calculator function as required or doing the calculation on paper and then inputting the answer. If the student requests HELP, then the program presents a problem in a step-by-step manner and the student responds accordingly.

The questions in the first chapter are preprogrammed. In all subsequent problems the introductory problem remains consistent, but the derivative questions appear to be randomly generated.

Immediate feedback is usually provided after each user input. A correct response results in a brief congratulatory message. In most cases an incorrect response results in an audio beep to signify the utilization of a wrong key or the student is told to try again. The student has the option of asking for HELP or may continue to try to solve the question on his/her own. After the second incorrect response, the program usually suggests doing it together and explanations and assistance are given. No quantitative feedback is provided.

A reproducible pre-test is included in the teacher documentation. No post-tests are provided.

Branching is provided in the program to give a "little help" or "lots of help". In some problems, the student is also able to go back to a previous step by typing "R". The branches review facts or provide information in alternate ways such as a different diagram, a restatement of facts in point form, etc. for the applicable step in the problem solution.

INSTRUCTIONAL FORMAT EVALUATION

The instructional techniques used in this program are appropriate for most of the target audience. Student interaction is appropriate with the student being an active participant throughout most of the program. There appears to be sufficient interaction to promote learning. The calculator function is a definite advantage in this program; however, no check is made on the validity of an entry when a student estimates an answer. Any numeric entry is accepted, even if it is inappropriate for the calculation; however, the student can later compare the estimate with the calculator answer. If a student persists at trying hard problems without requesting help, (s)he can continue indefinitely. The use of "R" to back through the steps when a correction is needed is a good feature.

The questioning techniques are appropriate and generally effective. The derivative problems are randomized from a limited data base, but in some problems such as in Museum Trip the data bank is seriously limited by the values used. The cueing techniques are effective. The feedback which is positive, immediate and corrective is appropriate and effective for the target audience.

The pre-test which is provided will be helpful in initially checking out a student's problem solving skills.

The branches are appropriate and helpful and add strength to the program.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text and numbers are standard size and upper and lower case letters are used. Large print and inverse are used for emphasis e.g. names of the sections, positive feedback, etc. Some graphics are used in charts and diagrams within the program as well as in the little " happy face" which is used as a reminder to press the return key. The graphics are in color. An audio beep is used when a student hits an incorrect key.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are appropriate with upper and lower case letters utilized effectively. They are well organized and are easy to read and follow. Occasionally the screen appears to be crowded. The transition from one screen to another is good. Selective erasing is effective. The graphics are used appropriately and are effective on a monochrome screen as well as on a color monitor. The program is user friendly and it appears to be bomb proof under normal use. It can be used readily by a teacher with minimum computer competence.

IMPLEMENTATION SUPPORT DESCRIPTION

The entry competencies required for this program are a basic understanding of whole number operations, decimal and percent notation, rounding and estimation. An orientation session with the students prior to using the program is recommended.

A management system is not included in this program.

The teacher documentation includes the rationale for the program, instructional objectives, suggested grade levels, strategies for implementation.and integration, suggested pre- and post-activities and sample program runs.

A student text is available which includes pre-instructional activities, work sheets and follow-up activities. The user materials are an integral part of the total program.

IMPLEMENTATION SUPPORT EVALUATION

Most of the entry competencies which have been identified are appropriate for the target audience. Perhaps, the knowledge of exponents and e-notation could be added to that list. The teacher documentation is well organized and easy to follow. The user support materials are effective and contribute to the learning process.

This program consists mainly of problem solving; however, the problems vary in kind and level and are adaptable to a variety of classroom learning environments. This computer program is easy to use and can be used by a teacher with a minimum of computer competency. Since error handling and identification procedures are not recorded, the teacher will need to supervise this aspect. It is also noted that multiple copies of the disks may be required since the disk is constantly accessed and thus can only be used individually or with a small group.

SUMMATION

The content range, sequence and depth are appropriate and relevant to the target audience. The inclusion of challenging problems is very good; however, it is unfortunate that all portions of the program are not metricated and that some problems contain American content. The inclusion of the calculator functions is a very good feature.

The major weakness of the program is the lack of a management system. Also, although the instructional techniques are good, the questions in some chapters could be randomized more effectively with a larger data base. Also, the price is somewhat high even considering the inclusion of a set of workbooks.

STATUS

"Math Strategies: Problem Solving" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $210.00 (1984) from Science Research Associates at the address given at the beginning of the report. Note that that price includes 20 student texts. Additional texts may be purchased for $69.00 per pack of 10.

Defective diskettes will be replaced without charge within a 90 day warranty period. Subsequently diskettes which become inoperable through normal use may be replaced for $20. No time limit is given for this warranty.

MOPTOWN HOTEL

DESCRIPTION

Version: 1983
Display Language: English
Cost: $85.95 (1985)
Tel. #: (416) 447-5101
Users : Ages 9+

Title: Moptown Hotel
Authors: Leslie Grimm
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subject: Problem Solving
Topics: Analogies, closed sequences, differences/uniqueness, negation, formulate and test hypotheses, planning
Components: 1 diskette and backup, teacher guide (49p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional
Other Formats Available (not evaluated): Available in Apple format only

OBJECTIVES

The learner will develop the logic skills of:

1. Recognizing analogies
2. Completing closed sequences
3. Identifying unique features
4. Understanding negation
5. Formulating and testing hypotheses
6. Planning.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains seven progresssively ordered games designed to develop logic skills:

1. WHO'S NEXT DOOR: The student compares two figures on the screen and identifies the distinguishing trait. (S)he then creates the second member of another pair of figures so that they differ in a similar manner to the first pair.

2. CHANGE ME: Given the first and fourth figure in a sequence of four figures and given a rule about the differences between figures, the learner creates the middle two figures which complete the sequence.

3. SPOT ME: Given four figures, the learner identifies what unique feature makes one different from the rest.

4. WHOSE BIRTHDAY: Using program feedback concerning what traits a particular figure does not have, the student uses the skill of interpreting negative comments to guess the figure being described.

5. SECRET PAL: The student attempts to identify a particular figure by guessing its attributes. Using the feedback regarding how many attributes (s)he has chosen correctly, the student formulates a hypothesis and tests it.

6. MOPTOWN MAP: Five figures are displayed on a four by four grid. The student must identify the locations of the remaining eleven figures by determining the two rules that figures in each row and column must obey.

7. MOPTOWN HOTEL: Obeying rules about how many traits must differ between adjacent figures on the grid, players take turns putting figures onto a four by four grid.

Each game gives students the option of reading directions, and after completing a game (s)he has the option of playing the same game again or returning to the menu for an alternate selection. A set of five moppet playing cards which can be duplicated and used with students in a group situation are included.

PEDAGOGICAL CONTENT EVALUATION

The range, sequence, and depth of the programs are appropriate for the target audience and require the use of strategic thinking skills. Although the programs have clear playing instructions, there is no explanation of the strategy students should use, therefore the onus is upon the teacher to discuss the thinking skills involved and relate them to useful problem solving.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of selecting a game from the menu, electing to read/bypass instructions (these may be accessed at any time during the game by typing "?"), using the spacebar or return key to activate page turning, and entering single letters in response to choices given. Questions are randomly selected from a limited data bank. Feedback differs from game to game; correct answers are generally rewarded with a tune and a positive comment while incorrect answers receive a statement indicating that the input was wrong and a clue to aid in making a correct decision. A final evaluation is given in two of the programs: "Moptown Map" provides a percentage score based upon the number of turns taken and "Moptown Hotel" displays cumulative points and provides bonus points if the entire grid is completed.

INSTRUCTIONAL FORMAT EVALUATION

Active student involvement promotes motivation in each game. The feedback used is appropriate and complements the format of the game. Sequence, rate and amount are all appropriately user controlled.

While the playing instructions in the first five games are explicit, the instructions for "Moptown Map" and "Moptown Hotel" are somewhat ambiguous.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses both high-res and low-res colored graphics. Sound, which is used for both positive and negative reinforcement, is optional. ESCAPE can be used to exit any program and to return to the main menu.

TECHNICAL CHARACTERISTICS EVALUATION

Graphic displays are well designed and are appropriate to the target audience and user-controlled sound adds interest to the feedback. Although shade differences are apparent when a monochrome monitor is used, a color monitor is certainly recommended.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 30 pages and moppet cards.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, full descriptions of the programs and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, minimal educational support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the programs into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

The games contained on this disk are effective in developing problem solving skills and prove motivational to most students.

STATUS

"Moptown Hotel" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $39.95 U.S. (1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $85.95 (Canadian, 1985) from Addison Wesley at the address given at the beginning of the report. Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly fur price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time provided that only one activity is accessed; however, such use is subject to copyright laws and any license or purchase agreement.

MOPTOWN PARADE

DESCRIPTION

Title: Moptown Parade
Authors: Leslie Grimm
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subject: Problem solving

Version: 1983
Display Language: English
Cost: $85.95 (1985)
Tel. #: (416) 447-5101
Users : Ages 6-10

Topics: Matching similarities/differences, opposites and patterns/sequences; problem solving strategies.
Components: 1 diskette and backup, teacher guide (49p), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional
Other Formats Available (not evaluated): Available in Apple format only

OBJECTIVES

The learner will:

1. Identify similarities and differences in figures.
2. Recognize sequence patterns and apply them in next figure identification.
3. Identify the attribute(s) by which a cluster of figures is grouped.
4. Develop a language sequence of three adjectives followed by a noun.

PEDAGOGICAL CONTENT DESCRIPTION

Each of the seven games on this disk requires the student to identify a moppet--a figure made by combining the attributes of tall or short, fat or thin, red or blue, bibbit or gibbit (body features).

1. MAKE MY TWIN: Given one moppet, the student constructs a matched pair by choosing one correct attribute from each of four pairs of attributes.
2. WHO'S DIFFERENT: Given four moppets, the student identifies one which is different and indicates what attribute causes the difference.
3. WHAT'S THE SAME: Given four moppets, the student identifies the attribute they share in common.
4. MAKE MY OPPOSITE: Given one moppet, the student constructs an opposite to it.
5. WHO COMES NEXT: Four moppets are arranged in one of three given patterns. The learner decides which pattern is being used and creates the next moppet.
6. MOPTOWN PARADE: The learner sees the first moppet in a parade of five. (S)he creates the next four moppets by choosing ones which differ from each other according to a set number of attributes.
7. CLUBHOUSE: The student guesses which moppets belong in a group and uses the feedback to determine the rule(s) which determine the moppet grouping.

PEDAGOGICAL CONTENT EVALUATION

This disk uses eight character traits to describe the Moppet characters--this results in appropriate range for the lower end of the target audience but may be limiting for older students. The fact that a student can stop playing a game after correctly answering one question suggests that there is insufficient depth. Although the student can elect to do as many questions as (s)he chooses, it would seem preferable to have a number of problems consecutively posed rather than having the user request a new problem each time. The program offers good sequencing from simple to complex provided the programs are completed in the order they are shown on the menu.

The slight American bias present (e.g. an American flag) does not detract from program usefulness.

User support materials include a reproducible set of moppets and one of attribute cards. Although these may serve as a useful introduction to the program, they are not integral to its implementation.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists menu selection, using/disabling sound, reading/bypassing instructions, page turning and entering single letters or numbers in response to choices given. Questions are randomly selected from a limited data bank. Feedback is given after each answer with textual feedback statements accompanied by sound effects. Flashing figures are used to reinforce correct answers. Incorrect answers generally result in the wrong part being identified or the correct part being specified. The student can elect to see the instructions at any time by typing "?" and can exit any program at will by hitting ESCAPE.

INSTRUCTIONAL FORMAT EVALUATION

Active student involvement promotes motivation in each game. Playing instructions are explicit, although very young students may need the terminology explained to them (e.g. "character trait"). The fact that students are asked to enter letters to build moppets and numbers to describe character traits proves confusing. It would be better if letters were consistently used.

The feedback used complements the format of the game, however it does not explain why an answer is wrong. Sequence, rate and amount are all appropriately user controlled. Incorporating more evaluation may provide greater student motivation and aid the teacher in assessing student comprehension.

Since students are asked whether they wish to quit after each question, the option to exit a program using ESCAPE seems pointless.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses both high-res and low-res colored graphics. Sound, which is used for both positive and negative reinforcement, is optional. Standard size text is used within each program, however the menu is displayed in enlarged print.

TECHNICAL CHARACTERISTICS EVALUATION

Graphic displays are well designed and are appropriate to the target audience. Program transition is smooth and sound, which can be user disabled, adds interest to the feedback. Although shade differences are apparent when a black and white monitor is used, a color monitor is certainly recommended.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 30 pages and moppet cards.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, full descriptions of the programs and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, minimal educational support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the programs into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

This program effectively utilizes graphics, color and sound to provide an interesting introduction to problem solving skills which, although not directly a part of the primary curriculum, are necessary life skills.

STATUS

"Moptown Parade" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $39.95 U.S. (1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $85.95 (Canadian, 1985) from Addison Wesley at the address given at the beginning of the report. Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

This diskette has the advantage of being capable of operation with more than one machine at a time provided that only one activity is accessed; however, such use is subject to copyright laws and any license or purchase agreement.

MOTION GEOMETRY

DESCRIPTION

Title: Motion Geometry
Author(s): Gemini Education Group Inc
Publisher: Ginn and Company
Source: 3771 Victoria Park Avenue, Scarborough, Ontario M1W 2P9
Subject: Mathematics
Topics: Properties of rigid motion
Components: 2 disks with backups, teacher's guide (20p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $95.00 (1984)
Tel. #: (416) 497-4600
Users: Grades 7 & 8

OBJECTIVES

As a result of using this program students will be able to recognize the three basic motions and the corresponding types of images produced, describe each of these motions, identify the two types of symmetry and draw simple images.

PEDAGOGICAL CONTENT DESCRIPTION

The seven lessons presented contained in this package provide tutorial instruction in the three basic motions of geometry: slides, flips, and turns. The concept of symmetry is also discussed. Students are first exposed to familiar objects and then transfer this knowledge of motion to geometric figures. The lessons lead students successively through the properties of rigid motion, the formation of images, and then through a study of the concepts of line (reflective) symmetry and turn (rotational) symmetry.

Lessons 1 and 2 are basically introductory in nature; lessons 3 - 7 provide self-contained units of instruction dealing with a single concept of motion geometry.

PEDAGOGICAL CONTENT EVALUATION

Although sequence is menu driven and therefore under user control, following the lessons in succession results in a logical pattern of instruction dealing first with the concrete, then moving to the abstract, and finally moving to a combination of concrete and abstract motions. Content range and depth are appropriate to the intents of the program and to the junior high target audience. The fact that students can have explanations and examples repeated is a program advantage.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning via the RETURN key, pressing the space bar for extra practice problems, and entering alpha and numeric inputs. Shapes and positions of polygons presented throughout the demonstrations are randomly selected. Feedback, presented after every question, consists of combination text and graphics. Cumulative scores listing the number correct, incorrect, or correct on the first try are given at the end of each series of questions.

Students initially control sequence via menu selection, however once in a lesson, sequence is program controlled. Both rate and amount of presentation are user controlled.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is consistent throughout the lessons and keys not required are effectively disabled. Questions are randomly drawn from a well developed question bank. The program is tolerant of a range of answer formats, and if the answer is correct but the format is wrong, the answer is scored as correct and an explanation of format is presented. Instructions for required input are effectively displayed at the top of the screen at all times. Feedback is effective, although it often results in a crowded screen. (Perhaps removing the instructions before presenting the feedback would be less confusing). Although there is very little variation in feedback, the animated graphics are most helpful in visualizing the motion concept.

The fact that there is no built-in evaluation and that the student can easily control the length of the lesson makes it difficult for a teacher to diagnose area or weakness or assess progress other than by direct observation.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text appears in upper case standard size print with large lettering occasionally used for emphasis. Three main colors--red, green and blue--are used for animated diagrams. All screens are framed by a border. Sound is not used. The use of a color monitor is essential to program operation.

TECHNICAL CHARACTERISTICS EVALUATION

The computer is an excellent tool for conveying motion concepts both because of the speed with which examples can be produced and the ability to depict movement. While text displays are clear and easy to read, graphics are somewhat distorted. (A test screen is available to adjust the distortion level, but a certain amount of distortion seems inevitable).

The slow letter-by-letter printing of text on screen is distracting and the very slow removal of text and graphics proves annoying.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The twenty page teacher's manual includes operating instructions, equipment requirements, objectives, vocabulary terms, prerequisite skills, timing suggestions, and statements on the usage of the program and the subject matter covered. A student worksheet is provided to accompany each of lessons 3 - 7.

There is no management system.

IMPLEMENTATIONAL SUPPORT EVALUATION

Teacher documentation is well laid out and includes an excellent lesson plan for each program. Student support materials are helpful but could be more inclusive. The program is easy to use by persons with no previous computer experience.

The absence of a management system is a major disadvantage as it means there is no way for a teacher to check student progress or to diagnose areas of weakness other than by direct observation.

SUMMATION

This program makes excellent use of the computer as a medium to depict motion and manipulate diagrams in order to instruct in motion geometry. Color and animation add immensely to student understanding. Program weaknesses include slow character generation and removal, diagram distortion, and lack of a management system.

STATUS

"Motion Geometry" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $95.00 (1984) from Ginn and Company at the address given at the beginning of the report. Warranty information was not available at publication.

PERCENTS

DESCRIPTION

Title: Percents
Author: None cited
Publisher: Media Materials (previously Milton Bradley)
Source: 2936 Remington Ave., Baltimore, MD 21211
Subject: Mathematics
Topics: Percentage problems
Components: 1 disk, teacher's guide (35p.), 26 reproducible worksheets
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available only in Apple Format

Version: 1983
Display Language: English
Cost: $74.95 (1984)
Tel. #: (301) 235-1700
Users : Grades 6 - 8

OBJECTIVES

Students will be able to:

1. Rewrite percents as fractions in lowest terms.
2. Solve simple equations by division.
3. Solve simple proportions.

PEDAGOGICAL CONTENT DESCRIPTION

This package begins with three readiness speed drills (Rewriting Percents as Fractions, Solving Simple Equations, and Solving Simple Proportions) which are pre-requisite to the following five skill areas:

1. Finding a Percent of a Number: Students calculate the amount of discount that will be given on the purchase of a pair of shoes.
2. Finding a Base Number: Students determine the percents and the amounts of weekly commission for different salespeople.
3. Finding a Percent: Using the context of Jane's field goal record in basketball (number of shots taken and the number of baskets), students calculate the percentage one number is of another.
4. Solving Percent Problems: Given a table of quizzes that shows two out of three numbers (the total number of quiz items, the number correctly answered, or the percent score), students determine and solve the missing number.
5. Solving Two-Step Percent Problems: Students determine the amount of change due and then express this figure as a percentage of the original quantity.

Each program is available in three learning modes: mastery (test mode), practice, and instruction. The mastery mode is a timed drill where correct answers are supplied as feedback to incorrect responses, but no help is available; the practice mode has a help mode available which shows the student the solution to a similar type of problem; the instruction mode provides step-by-step direction in working through the question and arriving at the correct answer. Through use of the Student Record Manager, teachers can control student progress through the skill areas.

Reproducible student materials consisting of three sets of tests, twenty instruction and practice worksheets, student record sheets, and a class record sheet are provided.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence of this program are appropriate for the target audience and are effective in promoting the acquisition of basic percent skills. Content is presented in a clear, well-sequenced manner. Since the teacher assigns the appropriate learning modes based upon the students' pre-test scores and has the option of assigning any or all of the three learning modes available, sufficient depth is assured. Student support materials are effective for reinforcement and evaluation, although they do contain some additional question types to those presented on the computer program.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu and mode selection, entry of numerical answers, and use of RETURN to activate page turning. Questions are randomly generated from a limited data bank and are sequenced from easy to difficult. Feedback is given after each student response: a correct answer results in a short, randomly generated positive comment; an incorrect answer receives a comment such as "Try again" together with a line drawn through the error. A help avenue is available in the practice and instruction modes. (In the practice mode the help screen shows possible solutions to a similar type of problem; in the instruction mode step-by-step guidance in working through a problem is given). Quantitative feedback is given at the end of each drill. Although rate is user controlled, amount is program controlled (five questions in each skill area). Sequence can be teacher controlled via alterations to the Student Record Manager.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is generally appropriate and effective with sufficient student interaction to meet the objectives of the program. Pre-tests are directly related to computer program content. The provision of three learning modes in each skill area adequately accommodates individual differences. Feedback is immediate and often corrective; however, it is quite limited in variety and scope. (E.g. It provides assistance in setting up an appropriate proportion or equation, but the student is expected to have the skills necessary to solve it from that point on.) Occasionally positive comments are inappropriately given when a student has performed poorly. The provision of three learning modes plus a well-designed help avenue adequately accommodates for individual differences.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound is used to simulate the ticking of a clock in the readiness section. Color is used in the graphics (a boy on a raft), and on borders around displays. Standard size, upper/lower case print is used for most of the text with enlarged lettering for titles, problem presentation, and scoreboard. Flashing lettering is used to draw attention to important messages.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are clear and appropriate for the target audience and transition from one display to another is usually smooth. The graphics used in the readiness drills are interesting but, if the user wins, too time-consuming. Color adds interest but is not mandatory to program operation. Unfortunately the program makes no provision against accidental hitting of the RESET or ESCAPE keys which causes it to malfunction.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The Student Record Manager with a maximum capacity of 125 names provides the options of adding/deleting students, viewing/changing students on file, changing levels, and running lessons. After evaluating the results of pre-test scores, teachers can assign one of three entry levels to each student.

IMPLEMENTATIONAL SUPPORT EVALUATION

The functioning of the management system is clearly outlined in the guide and steps must be adhered to closely to ensure proper operation. Unfortunately the management system does not fully utilize the computer's capacity--all records have to be manually maintained on student record sheets; the updates are then entered into the computer.

SUMMATION

The major strengths of this program are the sequential presentation of percentage concepts, the high quality user support materials, the availability of three different learning modes (including help routines), and the active student interaction. Weaknesses include a poorly designed management system, lack of control over the amount of questions done in any program, and rather slow program movement.

STATUS

"Percents" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $74.95 (1984) from Media Materials at the address given at the beginning of the report. Warranty information was not available at the time of publication.

PIECE OF CAKE

DESCRIPTION

Title: Piece of Cake
Author: None cited
Publisher: Springboard Software Inc.
Source: 7807 Creekridge Circle, Minneapolis, MN 55435
Subject: Mathematics
Topics: Addition, subtraction, multiplication and division of whole numbers
Components: 1 disk, teacher's guide (6p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor
Other Formats Available (not evaluated): IBM PC, Atari, Commodore 64

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1983)
Tel. #: (612) 944-3912
Users : Grades 2 - 9

OBJECTIVES

This disk is designed to develop speed and accuracy in the recall of basic math facts.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains five games designed to provide drill and practice in basic arithmetic operations:

1. "The Bakery" provides practice in basic addition and subtraction of numbers up to 20 by visually adding/removing graphically depicted cakes.
2. "Multicake" provides multiplication practice up to 100. The user is shown a cake and is told how many slices the baker plans to make horizontally and vertically. Utilizing multiplication skills, the student determines how many pieces will result.
3. "Dividacake" provides division practice up to 100. The user is told how many pieces of cake are required and the number of slices that have been cut. The student is required to determine how many pieces each slice must be divided into in order to achieve the required number.
4. "Flashcards" presents flashcard types of questions according to the user's choice of problem type (addition, subtraction, multiplication or division) and the level of difficulty (beginner, learner, junior whiz, champion or supermath).
5. "Catchacake" randomly presents addition, subtraction, multiplication and division questions. Up to four students compete against time by attempting to answer the question before a cake, depicted at the top of the screen, falls to the floor.

PEDAGOGICAL CONTENT EVALUATION

Content is presented in a clear and accurate manner. Overall, there is sufficient range for the disk to be appropriate for the specified target audience; however, individual programs may not be appropriate for all ages. For example, seven year olds would likely experience difficulty with the higher levels of "Flashcards" and older students would find "The Bakery", "Multicake" and "Dividacake" somewhat slow and boring.

The program provides for sequencing by allowing a choice of difficulty levels; however, the amount of increment is inconsistent. For example, in "Flashcards" there appears to be very little increment between "Learner" and "Junior Whiz" but a very large increment is noted between the "Champion" and "SuperMath" levels.

INSTRUCTIONAL FORMAT DESCRIPTION

The student selects the program (s)he wishes to do from a choice of a word or a picture menu. After selecting the type of mathematical operation and the level of difficulty (when appropriate), student interaction consists of the entry of a single alphabetic or numeric key as an answer response. Questions are randomly selected and feedback, accompanied by sound, is provided after every response. Positive feedback provides a congratulatory message such as "You did it!"; negative feedback provides visual assistance by including a graphic representation of the problem. A color monitor is required to take full advantage of this assistance. Some of the programs provide evaluation in the form of a percentage score or in accumulated points. Students control sequence and rate (with the exception of "Catchacake" where questions are timed); amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The instructional format is generally appropriate for the target audience with the corrective feedback "Multicake" and "Dividacake" being exceptionally well done. Student input, which consists of single keystrokes, is appropriate; however, no opportunity is given to correct an answer which may have been entered in error.

Questions are randomly generated and feedback and evaluation techniques are effective. The timed responses in "Catchacake" encourage students to increase their computational speed. A concern exists with regard to the left to right method of answer entry in the "Flashback" program when dealing with calculations involving two or more digits. This is diametrically opposed to proper mathematical calculation techniques and may inculcate bad habits in students. Furthermore it often necessitates that pen and paper be used for calculations.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses sound both as a reinforcement and as an accompaniment to high resolution graphic movement. Color is also utilized.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are well formatted with effective use being made of color and graphics. The fact that sound cannot be disabled is a program liability.

SUMMATION

The program provides a variety of motivational methods for directing basic math drill and practice routines for students.

STATUS

"Piece of Cake" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1983) from Springboard Software at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 30 day warranty period unless the product has been damaged by accident, abuse or modification.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

PROBLEM SOLVING IN ALGEBRA

DESCRIPTION

Title: Problem Solving in Algebra
Author: John Haugo
Publisher: Encyclopaedia Britannica
Source: c/o Visual Education Centre, 75 Horner Ave., Unit One, Toronto, ON, M8Z 4X5
Subject: Mathematics
Topics: Problem solving in one, two or three variables
Components: 5 diskettes, manual (21p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80

Version: 1983
Display Language: English
Cost: $421.00 (1984)
Tel. #: (416) 252-5907
Users : High School

OBJECTIVES

The learner will be able to read, translate and solve word problems that involve linear and quadratic equations in one, two or three variables.

PEDAGOGICAL CONTENT DESCRIPTION

This package consists of an introduction and thirty-eight programs on five disks:

DISK 1: Programs 1 - 7 present problems which ask the student to translate phrases into symbols (from numeric through two variable phrases) and write mathematical statements for word problems involving simple numbers, larger numbers, and one to three variables.

DISK 2: Programs 8 -14 present problems related to understanding word problems, graphing ordered pairs, constructing a table of values, translating word problems into systems of equations, and solving a system of equations by graphing or substituting.

DISK 3: Programs 15 - 21 review the solution of systems of linear equations in two variables by addition, translate word problems in geometry to systems of equations, solve systems of equations in three variables by substitution, review the comprehension of mathematical sentences, and solve systems with fractional coefficients.

DISK 4: Programs 22 - 30 address word problems involving fractions and money combinations, mixture problems given total weight or total value, motion problems with objects moving in parallel/opposite directions, and interest problems with combined rates.

DISK 5: Programs 31 - 38 include motion problems involving round trips, rate of work problems, rate problems for general events, mixture problems concerning the percentage of solute in the total solution, problems involving solving quadratics by factoring, and solving word problems which require the development of quadratic equations.

Generally the programs have a combination lesson/drill format. Prior classroom instruction is assumed; however, concepts are reviewed and student mastery is checked via a drill exercise. At the end of each program the student is given a score and a code which (s)he is expected to enter on a "Progress Chart" included in the documentation.

PEDAGOGICAL CONTENT EVALUATION

This package has an impressive range of content which should serve the needs of a large number of high school math students. The sequencing of the content is acceptable, although the progression from easy to more difficult problems with an unfortunate corresponding decrease in the amount of instruction given may cause problems for the less capable students. The range of content is appropriate except for the noticeable omission of a program dealing with the quadratic formula. The content is accurate but largely uses imperial units. Paper and pencil are required for many of the problems.

INSTRUCTIONAL FORMAT DESCRIPTION

Students select a program from the menu but henceforth sequence, rate and amount are all program controlled. Student interaction consists of initial menu selection, page turning, frequent answer input (numeric, variable and procedural) or multiple choice answers. Some problems have randomonly generated examples or questions drawn from a limited data bank; other programs use a fixed question bank. Feedback is provided after every question: correct responses receive a short, varied message; incorrect responses generally receive a "No, try again" message. The nature of the negative feedback depends upon the difficulty of the question. Simple questions receive the correct answer immediately following the first incorrect responses; more difficult questions may receive hints or step-by-step solution walk-throughs. Quantitative feedback, both cumulative and by question type, is given at the end of every program.

INSTRUCTIONAL FORMAT EVALUATION

In general the instructional technique is appropriate for the content, objectives and target audience, and includes an effective analysis of the skills required in the solution of word problems. There is frequent student interaction and questioning is satisfactory. The effect of a lack of randomization in the drill sections of some programs is minimized by the use of a large number of questions; however, in some cases this is itself a problem since the attention span of some students may be exceeded by the time required to complete the program. The student may leave a program at any time, but if (s)he returns to it (s)he must start at the beginning. This could be a significant program design weakness. More questions relating to the procedure of program solving would be useful.

Negative feedback is accurate and non-threatening, but could provide more explanation in many cases.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text in a variety of fonts is presented in combination upper/lower case. Color and graphics are used for animation of text characters and to highlight important sections of the display. Sound is used to signal inappropriate responses.

TECHNICAL CHARACTERISTICS EVALUATION

Text displays are clear, well-organized, and use appropriate character size. Good use is made of graphics and selective scrolling to emphasize important sections of text. Programs are generally easy to use and, with the exception of programs 13 and 21, are essentially bomb proof.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The managament system consists of a student progress code that is given to every student upon completion/exit from a program and is to be manually recorded by the student on his Student Progress Chart. The code provides the program number, the number of problems in the lesson, and other information regarding accuracy of performance. The teacher uses a Class Progress Chart for manually recording the progress codes of each student. These codes are not stored on the disk itself.

IMPLEMENTATIONAL SUPPORT EVALUATION

The value of this management system is deterainined by the accuracy of the record keeping. If the student records the codes accurately, then the teacher would have a useful record of student progress. The management system could certainly be improved by having the codes stored on disk as files that could be accessed by the teacher.

SUMMATION

Although these programs do not provide enough instruction to be used as a stand alone instructional method, good sequencing and sound instructional design allow them to be effectively used for enrichment, remediation, or review activities.

STATUS

"Problem Solving in Algebra" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $421.00 (1984) from Visual Education Centre at the address given at the beginning of the report. A package with an extra set of noncirculating back-up diskettes costs $581. Defective diskettes will be replaced without charge within a 30 day warranty period. Thereafter, diskettes may be replaced for $32 upon their return.

RATIOS AND PROPORTIONS

DESCRIPTION

Title: Ratios and Proportions
Author: None cited
Publisher: Media Materials (formerly Milton Bradley)
Source: 2936 Remington Ave., Baltimore, MD 21211
Subject: Mathematics
Topics: Ratio and proportion
Components: 1 disk, teacher's guide (35p.), 26 reproducible worksheets
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available only in Apple Format

Version: 1983
Display Language: English
Cost: $74.95 (1984)
Tel. #: (301) 235-1700
Users : Grades 6 - 8

OBJECTIVES

Students will be able to write fractions (ratios) in lowest terms, solve simple equations by division, write ratios and proportions in context, and write and solve proportions given word problems.

PEDAGOGICAL CONTENT DESCRIPTION

This package begins with two readiness speed drills (rewriting fractions in lowest terms and solving equations by division) which are pre-requisites to the following five skill areas:

1. Writing Ratios in Context: Users assess the test grades of two classrooms of students by writing comparison ratios in lowest terms.
2. Writing Proportions in Context: Using information gleaned from a table of hits during six months of the professional baseball season, students are asked to conclude whether the ratios used form a proportion.
3. Solving Stated Proportions: The student is given a proportion with one missing value for which a solution has to be found.
4. Solving Proportions in Context: Using information from a table of data involving sales at a grocery store, students are asked to solve a word problem using proportions.
5. Writing and Solving Proportions in Context: Given a table of data, the student must write a proportion (which must include a variable) and then solve the problem.

Each program is available in three learning modes: mastery (test mode), practice, and instruction. The mastery mode is a timed drill in which feedback is limited to presenting a correct answer if an incorrect response is made; the practice mode has a help avenue available which illustrates the solution to a similar type of problem; the instruction mode provides step-by-step direction in how to solve a given problem. Through use of the Student Record Manager, teachers can control student progress through the skill areas.

Reproducible student materials consisting of three sets of tests, twenty instruction and practice worksheets, student record sheets, and a class record sheet are provided.

PEDAGOGICAL CONTENT EVALUATION

The range of content is generally appropriate for the average/above average student in the target audience. Material is presented in a clear, well-sequenced manner and the teacher option of assigning learning modes results in sufficient depth to accommodate individual differences. User materials, which could be used independently or in conjunction with the disk, are effective in providing reinforcement and practice of the skills presented in the computer program. Worksheet problems utilize both imperial and metric measurements. The tests provided are useful for evaluative purposes.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu and mode selection, numerical answer entry or use of the "E" or "I" keys to access help routes. Questions are randomly generated from a limited data bank and are sequenced from easy to difficult. Feedback is given after each student response: a correct answer results in a positive comment randomly chosen from a group of six; an incorrect answer receives a comment such as "Try again" and/or a line drawn through the error. In the practice sections, help in the form of clues for arriving at a solution is automatically provided after two unsuccessful attempts at solving a problem. Quantitative feedback is given at the end of each drill. Except for the "Readiness Skill Section" in which rate and amount are program controlled, the user generally has control over rate. Sequence can be teacher controlled via alterations to the Student Record Manager.

INSTRUCTIONAL FORMAT EVALUATION

Instructional technique is generally appropriate and effective with sufficient student interaction to meet the objectives of the program. Pre-tests are directly related to computer program content. The provision of three learning modes in each skill area adequately accommodates individual differences. Questions are appropriate to the target audience; however, lack of sufficient randomization may result in the same question being posed within a given set. Feedback is immediate; however, it often does not distinguish between a wrong answer and incomplete or wrong format. Occasionally positive comments are inappropriately given when a student has performed poorly. Help avenues, while otherwise well-designed, make no allowance for different types of errors, hence a student who makes two errors on the same question is taken through identical steps of remediation.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound in the form of a ticking clock is used to indicate time lapse in the readiness skill section. Important reminders are highlighted by flashing. Text is presented in combination upper/lower case with high resolution text formation for problem sets. Minimal graphics and color are used.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are appropriate for the target audience and transition from one display to another is usually smooth. In the readiness section the last display overwrites the previous one, resulting in an undecipherable screen. Pace of presentation is slow and may prove frustrating to above average users. Color adds interest but is not mandatory to program operation.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The Student Record Manager with a maximum capacity of 125 names provides the options of adding/deleting students, viewing/changing students on file, changing levels, running lessons. After evaluating the results of pre-test scores, teachers can assign one of three entry levels to each student.

IMPLEMENTATIONAL SUPPORT EVALUATION

The functioning of the management system is clearly outlined in the guide and steps must be adhered to closely to ensure proper operation. Unfortunately the management system does not fully utilize the computer's capacity--all records have to be manually maintained on student record sheets; the updates are then entered into the computer.

SUMMATION

The major strengths of this program are the sequential development of ratio and proportion concepts, the high quality of user support materials, the availability of three different learning modes (including help routines), and the effective student interaction. Weaknesses include a poorly designed management system, lack of control over the amount of questions done in any program, and rather slow program movement.

STATUS

"Ratios and Proportions" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $74.95 (1984) from Media Materials at the address given at the beginning of the report. Warranty information was not available at the time of publication.

SIMULTANEOUS LINEAR EQUATIONS

DESCRIPTION

Title: Simultaneous Linear Equations
Author: Mark Berman, Kevin Vessio & Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Mathematics
Topics: Solving linear equations
Components: 1 diskette, backup, guide (5p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS 80 Models III/IV, Commodore 64, IBM PC/PCjr

Version: 1984
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 9-12

OBJECTIVES

This disk is designed to:

1. Provide students with practice in solving simultaneous linear equations by addition and subtraction.
2. Show the relationship between an algebraic solution and a graphical solution of two linear equations.

PEDAGOGICAL CONTENT DESCRIPTION

Following an optional explanation, the student is given problems to solve with two simultaneous linear equations, generated in the form of $Ax + By = C$. All coefficients and solutions are integers between -5 and $+5$ inclusive. The student must solve for both variables algebraically. Each equation solution is graphed at the end of the solution process.

Any number of questions may be chosen between 1 and 9. For each question the student provides a solution by entering the appropriate information step by step. If incorrect information is entered the program provides hints and keeps track of the number of errors that occur in the process of arriving at a solution. This information is then given to the student at the end of that question.

PEDAGOGICAL CONTENT EVALUATION

The content is appropriate for the middle to upper range of the target audience. Content range is sufficient, but it is unfortunate that problems are not sequenced from easy to hard. It would likewise be useful to have a few more difficult problems involving rational coefficients included to challenge the more adept students. The program utilizes a consistent pattern of presentation and material is logically organized. Each step is clearly presented with cues and prompts on the lower part of the screen. A variety of mathematically correct methods for solving equations is allowed.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction involves menu selection, page turning via the RETURN key, entering the number of questions desired, and numerical answer inputs. Questions are randomly selected from a limited test bank. An incorrect answer results in several encouraging hints designed to help the student achieve the correct answer. A correct answer to each step in the solution promotes the student to the next part of the question, and after achieving a final correct solution, a congratulatory message is displayed. When all questions have been completed, the program lists the errors according to type (e.g. eliminating a variable, solving linear equations or computations, etc.)

Sequence is program controlled, however the user has control over rate and amount.

INSTRUCTIONAL FORMAT EVALUATION

Instructional technique is appropriate in helping students improve their skill at solving linear equations. Student interaction is generally effective; however, instruction and answer verification sections limit student involvement to page turning and hence may not be very motivating. Feedback is appropriate as it provides a hint before giving the correct answer, thus encouraging students to think for themselves. The graphical solution further reinforces each correct solution. As a drill and practice program, the error analysis following each set of questions is quite useful; however, it is unfortunate that it is not included in a management system to provide teachers with a summary of student progress.

Students have the option of reading/bypassing instructions; however, the program does not allow the user to go back to a previous question for review or to opt out of a section without beginning the program again.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound and color are not used in this program. High resolution graphics are used to plot all simultaneous equations.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are clear and well formatted. Pertinent information is effectively kept on the screen at all times and only the workspace area is scrolled. Within each program the user has effective control to enable comfortable reading and absorption of each display; however, the fact that a student cannot exit a program and later re-enter at the point at which (s)he left off is an undesirable feature.

SUMMATION

Although this program does not offer instruction in depth, it does provide useful reinforcement and practice in the area of solving simultaneous linear equations. Students are effectively guided through a pattern for arriving at a correct answer and can see this solution in graphic form.

STATUS

"Simultaneous Linear Equations" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from Microcomputer Workshops at the address given at the beginning of the report. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshop products are carried by Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

STICKYBEAR NUMBERS

DESCRIPTION

Title: Stickybear Numbers
Authors: Janie & Steve Worthington
Publisher: Weekly Reader Family Software (Xerox)
Source: c/o C.P.R. Software Distributors, P.O. Box 431, Brantford ON N3T 2J0
Subjects: Mathematics, Early Childhood
Topics: Counting
Components: 1 disk, teacher's guide (4p.), look book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple Format only

Version: 1982
Display Language: English
Cost: $49.95 (1984)
Tel. #: (519) 756-7198
Users : Ages 3 to 6

OBJECTIVES

The objectives of this program are to:

1. Reinforce counting and number recognition.
2. Stimulate observation, experimentation, and exploration.
3. Provide children with a positive first experience with computers.

PEDAGOGICAL CONTENT DESCRIPTION

The student is instructed to depress any number from 0 to 9. The computer then generates an animated display, accompanied by sound, of the corresponding number of objects. If the space bar is pressed, one object will disappear and the number portrayed will be decreased by one. This process can be continued until the screen is cleared of objects. The space bar can similarly be used to count up from zero to nine.

A hard-cover, 32 page LOOK BOOK, a colorful poster, and eight Stickybear stickers are included as student support materials.

PEDAGOGICAL CONTENT EVALUATION

The content range, depth and sequence are appropriate for the intended audience. The program is generally effective in presenting the concept of counting and introducing the notion of addition and subtraction by incremental/decremental steps of one. User support materials provide reinforcement of the disk contents but are not integral to its use.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of depressing a number and then using the spacebar to reduce the number of objects shown to zero or to count from zero to nine. Approximately twenty randomized objects can be depicted. No quantitative feedback is provided; rather the computer increases or decreases the number of objects shown in correlation with the student's input. Program sequence, rate and amount are all user controlled.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is appropriate for the intents of the program. The user controls rate, sequence, and amount. Visual feedback is immediate and consistant. While no pre-tests or post-tests are included, this does not detract from program effectiveness.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution color graphics with animation and audio are used.

TECHNICAL CHARACTERISTICS EVALUATION

The high resolution graphics with animation, color and audio are appropriate and motivating for the intended audience. While the program is more effective when run on a color monitor, the use of a monochrome monitor does not detract from program usefulness. Sound is interesting; however, the inability to disable it may prove a disadvantage in the classroom.

Displays are clear and well formatted, and transition from one display to the next is smooth. Some confusion exists when students are attempting to count moving objects which cross each other (e.g. fish, penguins, hearts); perhaps this cross-movement could be eliminated. Program strength could be improved by consistently encouraging left to right or top to bottom counting.

SUMMATION

Program content and format are appropriate to the media and motivating for the intended target audience.

STATUS

"Stickybear Numbers" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.95 (1984) from C.P.R. Software Distributors at the address given at the beginning of the report. Warranty information was not available at publication.

In Alberta, the product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

STICKYBEAR SHAPES

DESCRIPTION

Title: Stickybear Shapes
Authors: None cited
Publisher: Weekly Reader Family Software (Xerox)
Source: c/o C.P.R. Software Distributors, P.O. Box 431, Brantford ON N3T 2J0
Subjects: Mathematics, Early Childhood
Topics: Geometric shapes
Components: 1 disk, teacher's guide (4p.), shapes book, poster, stickers
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple Format only

Version: 1983
Display Language: English
Cost: $49.95 (1984)
Tel. #: (519) 756-7198
Users : Ages 3 to 6

OBJECTIVES

This program is designed to:

1. Identify and reinforce the recognition of five common geometric forms: circle, square, triangle, rectangle and diamond.
2. Familiarize young children with the computer by encouraging exploration, discovery and hands-on experience.

PEDAGOGICAL CONTENT DESCRIPTION

This program contains three games:

1. PICK-IT: Each picture display contains a missing shape. Students choose one of the five shapes displayed at the bottom of the screen (circle, square, triangle, rectangle, and diamond) in order to complete the picture.
2. NAME IT: From a choice of five shapes, students must choose one to match the name of the shape displayed.
3. FIND IT: Using the arrow keys, students match a sample shape presented at the bottom of the screen with a corresponding shape displayed in an array at the top of the screen.

The support materials (a hardcover book called "Shapes" and eight stickers) are designed to expand the student's recognition of shapes.

PEDAGOGICAL CONTENT EVALUATION

Content range and depth are appropriate and effective for the upper range of the intended audience; however, three and four year olds may require adult intervention.

The user support materials are useful for discussing and reinforcing the recognition of the shapes.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of a choice of using a paddle or the keyboard, selection of one of the three games from the menu, using a paddle or the arrow keys to input correct responses, using the space bar for page turning, and pressing ESCAPE to exit from a game.

Ten pre-programmed questions are used in "Pick It"; however, randomized questions drawn from a limited test bank are used in the remaining two programs. The user terminates a program by pressing the ESCAPE key.

Immediate feedback is provided after every response. Correct responses receive a picture which becomes animated and is accompanied by audio. Incorrect responses receive a low "bloop" and the user is encouraged to repeatedly try again until the correct response is found.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is effective in developing and reinforcing the recognition and identification of five geometric shapes. Student interaction encourages a trial and error approach. While learning by discovery and experimentation may be desirable, it is not a practical approach in a kindergarten/grade one setting where usually only a few computers are available.

The questioning technique used is appropriate; however, the data base is limited. Feedback is immediate and consistent. The animated graphics and the use of sound combine to make the program interesting and motivational.

The user appropriately maintains control of rate and amount; however, after initial game selection sequence is program controlled. The addition of some form of quantitative feedback would strengthen this program.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution, colored graphics accompanied by musical tones are used throughout the program. Large combination upper/lower case lettering is used for text.

TECHNICAL CHARACTERISTICS EVALUATION

The high resolution, animated graphics accompanied by sound prove very motivational for the target audience. Although the program is more effective when a color monitor is used, its use is not essential. Displays are clear and well-formatted. Transition is generally smooth; however, the sound which occurs between the displays in "Find It" should be eliminated. The use of sound in general may prove disruptive in a classroom setting; however, it is integral to the feedback of the program.

SUMMATION

Animated graphics and sound combine to make this program very interesting and motivating for the intended audience.

STATUS

"Stickybear Shapes" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.95 (1984) from C.P.R. Software Distributors at the address given at the beginning of the report. Warranty information was not available at publication.

In Alberta, the product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel. Contact the companies directly for price and warranty information.

THE FACTORY

DESCRIPTION

Title: The Factory
Authors: Marge Kosel, Mike Fish
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Problem Solving
Topics: Understanding sequence, logic & efficiency, inductive thinking, spatial perception
Components: 1 disk with back-up, teacher's guide (11p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor (preferred)
Other Formats Available (not evaluated): TRS-80 Color Computer, Commodore 64, Atari

Version: 1983
Display Language: English
Cost: $49.00 US (1984)
Tel. #: (914) 769-5030
Users: Grades 4 - 9

OBJECTIVES

This disk is designed to provide students with experiences which will help them to:

1. Develop visual discrimination and spatial perception skills.
2. Understand the importance of sequence and order.
3. Use the cognitive strategy of working backwards.
4. Understand that there may be more than one solution to a problem.

PEDAGOGICAL CONTENT DESCRIPTION

This program promotes the skill of problem solving using the concepts of sequence, rotation, visual discrimination, spatial perception and logic. Students are presented with three different machines that can rotate, punch holes and draw stripes on a square. There are three levels of difficulty:

1. Test a Machine - allows students to experiment with the three machines.
2. Build a Factory - allows students to design his/her own product using one to eight machines.
3. Make a Product - permits a student to examine a product and then work backwards to determine what process took place to construct the product.

PEDAGOGICAL CONTENT EVALUATION

The pedagogical content is appropriate for the target audience and offers just enough challenge to keep a student interested but not frustrated. Excellent sequencing allows students to first learn the use of machines through simple manipulations and then move on to more challenging ones. Good depth is available. The topics used for problem solving are current and the skills developed are applicable to many areas of the curriculum.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of selecting a program from the menu and choosing the level of difficulty. Designs are created via the arrow keys and the RETURN key. Problems presented by the program are categorized as easy, medium and hard and are randomized within each section. The program accepts a variety of formats. If an incorrect solution is derived, the program tells the student that his/her product has a flaw and asks if (s)he would like to try again. Correct solutions result in the message "You made the product correctly". There is no summative feedback provided.

Sequence, rate and amount are controlled by the user.

INSTRUCTIONAL FORMAT EVALUATION

Ample opportunity for student interaction is provided and the method of interaction is simple and consistent. While the program does allow for the correction of incorrect entries, this process could be better explained on the screen. Inputs are accepted at an appropriate rate, however the graphic generation which shows how each machine changes the product tends to be a bit slow. Feedback is appropriate, and permitting numerous attempts at arriving at a solution is effective for this type of problem solving. The fact that students have total control of rate, sequence and amount makes it suitable for a variety of learning abilities. (Young students should be encouraged to tackle the programs in consecutive order as the concepts presented in earlier programs provide essential stepping-stones for successive programs).

TECHNICAL CHARACTERISTICS DESCRIPTION

Large size combination upper/lower case lettering is used. Graphics are accompanied by sound.

TECHNICAL CHARACTERISTICS EVALUATION

Screen displays are effectively formatted and sound employed mimics the operation the machine is carrying out.

IMPLEMENTATIONAL SUPPORT: DESCRIPTION

The eleven page teacher's guide offers instructional objectives, strategies for classroom implementation, a description of disk contents and program operating instructions. It also includes a readability level, examples and a suggested program sequence.

A one-page reproducible student handout is available for students to keep a written record of how their product was constructed.

IMPLEMENTATIONAL SUPPORT: EVALUATION

The teacher's guide is well-organized and easy to use. The student handout is effective in the areas of developing a strategy or design before it is entered, however it is not essential to program operation.

The disk can be used by a student with a minimum of computer competency. Little teacher supervision should be required as the disk is self-explanatory.

SUMMARY STATEMENT

This program is very motivating, easy to use and is reliable in normal classroom applications. It encourages students to approach problem solving from many different perspectives.

STATUS

"The Factory" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, the product may be purchased Edupro Software and Roxcel. Contact the companies directly for price and warranty information (see page v. of the preface).

THE KING'S RULE

DESCRIPTION

Title: The King's Rule
Author: Thomas C. O'Brien
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Mathematics
Topics: Generating and testing hypotheses
Components: 1 disk & backup, teacher's guide (21p.)
System Requirements: Apple II+/IIe/IIc, 48K, disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1984
Display Language: English
Cost: $49.00 US (1984)
Tel. #: (914) 769-5030
Users: Grade 4 +

OBJECTIVES

This program is designed to:

1. Train students to form and test hypotheses.
2. Build skills in recognizing numerical patterns and relationships.
3. Develop skills in critical thinking and problem solving.

CONTENT DESCRIPTION

This program, written in a fantasy game format, allows a student to advance through a castle by successfully generating and testing hypotheses at six levels of difficulty. If the student reaches the throne, (s)he is awarded the crown.

At each level students are shown three numbers which correspond to a secret mathematical rule. Students must generate a hypothesis about the rule and test it by entering their own sets of three numbers which hopefully will comply with the rule. The computer checks that the student entered numbers against the rule, and responds with a "Yes" or "No". When the student feels confident that (s)he knows the rule, (s)he can take a five-question quiz which will test his/her conclusions. The user must solve three consecutive number riddles at each level before being allowed to progress to the next level of difficulty. Descriptions of the program contents of the various levels are available via menu.

There is a teacher section to the program which can be accessed by pressing Control T. This allows for sound to be turned on/off, difficulty levels to be set and viewing of the rules.

CONTENT EVALUATION

The program is well sequenced: Level 1 games deal with small upward/downward jumps from 1-10 inclusive--this is increased to numbers between 1 and 30 by Level 3. Level 4 games introduce linear equations, exponents and absolute values, and Levels 5 and 6 progress to number relationships such as consecutive even numbers, multiples, consecutive multiples, addition of constants, ascending orders, and the idea of a number being divisible by or ending in a specified number. While this sequence does progress from concrete to more abstract principles, the transitional jump between levels 3 and 4 is large.

The fact that students can enter the program at any level coupled with the teacher option of raising or lowering the levels of difficulty allows for good range. Since students can hypothesize about a rule for as long as needed, sufficient depth is assured.

On the whole, content is clearly and accurately presented.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of page turning, alphabetic menu selections and numerical inputs to test hypotheses. Both the "secret" mathematical rules and the supporting examples are randomly drawn from a limited test bank. Textual feedback is given in the form of "yes" or "no" in reply to whether a student's number set follows the secret rule and visual awards, based on the theme of the program, are given if the quiz is completed successfully. Branching routes an unsuccessful quiz taker back for more hypothesis testing.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design of this program is educationally sound. Students have total control of rate, sequence and amount. The questioning and feedback techniques used are appropriate to a drill program, however they are not instructive. Negative feedback is non-threatening and allows the user to re-evaluate answers. Effective branching provides additional hypothesis testing for students who are unable to complete a given test successfully.

At higher levels rules may either be very abstract or very selective. At this point more specific feedback (prompts, hints, etc.) may be appropriate to aid the user in comprehending the rule.

TECHNICAL DESIGN DESCRIPTION

This program uses graphics and color to provide displays of castles, knights, shields, flags, chess pieces and crowns. Sound, which may be teacher disabled, accompanies the feedback to all user responses.

TECHNICAL DESIGN EVALUATION

Displays are well formatted and suitable for the target audience. Text is easy to read and transition within the program is smooth. Colorful and detailed graphics add interest. Ample "work area" is provided on which students can test their hypothesis.

IMPLEMENTATIONAL SUPPORT: DESCRIPTION

A 21 page teacher's guide provides a program overview, objectives, an explanation of difficulty levels, background information on how to play the game, suggestions for using it in the classroom, a list of the rules used in the program, warranty information, etc.

IMPLEMENTATIONAL SUPPORT: EVALUATION

Although this program does not contain any student support materials, the teacher's guide provides a useful program overview and contains good suggestions to aid classroom implementation.

SUMMARY STATEMENT

The game format utilized in this drill and practice disk proves motivating for the intended audience and is effective in developing a student's critical thinking skills. The ability to enter the sequence at any point coupled with the teacher provision of setting the difficulty level enables this disk to be used at a variety of learning levels.

STATUS

"The King's Rule" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, the product may be purchased Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

THE WHATSIT CORPORATION

DESCRIPTION

Title: The Whatsit Corporation
Author(s): None Cited
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Business Education, Mathematics
Components: 1 disk & backup, teacher's guide (54p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model III/IV

Version: 1983
Display Language: English
Cost: $49.00 U.S.(1984)
Tel. #: (914) 769-5030
Users: Grade 6 - Adult

OBJECTIVES

This package is designed to:

1. Provide practice in calculating, estimating, record keeping, working with equations and multiple variables, and reading graphs.
2. Teach students to use mathematics as an analytical tool in making decisions and finding solutions.
3. Provide simulated experience in managing a business.
4. Develop problem-solving skills such as planning ahead, working in two time frames, and evaluating and modifying a strategy.

CONTENT DESCRIPTION

This program is a simulation in which a student runs a small, one product business for up to six months. The user may conduct market surveys, buy a franchise, hire outside consultants, take out a loan, etc. Weekly and monthly decisions involve hiring and laying off people, ordering inventory, setting prices, paying off loans, hiring accountants, and buying advertising services. A monthly statement of income and expenses provides students with information on which to base their next month's decisions.

CONTENT EVALUATION

Students must have classroom instruction in business and marketing terminology prior to using this program. Although the target audience is specified as grade six to adult, the range would be most appropriate to upper junior high students or possibly as a review of basic math skills at the high school level. The option of repeating the simulation as often as desired provides ample depth.

Used in a math classroom, this program offers an interesting approach to basic calculations (addition, subtraction, multiplication, division) and some formula applications (e.g. interest calculations).

This program could also be used in a business education classroom to provide a very basic introduction to marketing/business strategies; however, caution must be exercised to assure that students understand that it is a bare-bones simplified model that is being portrayed and that running an actual business involves a host of factors not even alluded to in this simulation (e.g. overhead expenses, taxes, insurance costs, marketing and distribution costs, etc.) While the program should provide students with an understanding of the need for careful planning, decision making and record keeping in order to make a profit, the options of bankruptcy or receivership should a business be unsuccessful are not discussed. Furthermore the limitation to selling just one item may be unrealistic and the practice of allowing repeated rush orders of 40 items of inventory may inculcate poor business habits.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of making choices from weekly and monthly decision menus and entering the requested numerical data. Feedback consists of a double check on the accuracy of student input, reminders of decision already made or to be made before a new decision can be implemented, quantitative monthly reports (income statements) and weekly qualitative reports (e.g. "We ran out of whatsits"). There is no formal evaluation of student success--students are left to analyse their productivity based upon the results of the monthly statement provided.

Rate is user controlled; sequence and amount are program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The amount and type of student interaction is appropriate for the target audience; however, the level of abstraction combined with the attention span required for the six month run may be beyond the range of the younger students. (This is partially alleviated, however, by the ability to save an "in progress" simulation for resumption at a future time). The simulation utilizes an effective method of inquiry causing students to apply high level thinking skills. While feedback is very limited, the cueing prompts are effective in aiding students in decision making. Weaker students lacking skills in self-evaluation may need teacher assistance in analyzing their performance.

The simulation lends itself to either an individual or team approach.

TECHNICAL DESIGN DESCRIPTION

Displays are totally textual in nature and utilize combination upper/lower case standard size lettering. Color in the form of underlining is used for emphasis. A series of clicks draws attention to economic forecasts and beeps are used to denote entry errors.

TECHNICAL DESIGN EVALUATION

Character size is appropriate, screen displays are clear and transition is smooth. Unfortunately the program does not allow a review of previous decisions and their financial outcomes. It would be most appropriate to utilize graphs and charts to provide this information to aid in wise decision making. The minimal use of color and lack of graphics make the program appear dull to younger users. The ability to save data to permit continuation at a future date is a program strength.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The sixty page teacher's guide provides instructions, activity master sheets, and transparency masters which are essential for use prior to program operation. The program will store up to 40 sets of student data.

MANAGEMENT SYSTEM EVALUATION

The teacher's guide and the user pre-activity materials provide excellent and essential program support. The ability to store data for future resumption is advantageous, however it would be useful if the teacher could actually view the results of a student's decisions in order to assist him/her in making a self-analysis of progress. (At present, the teacher can delete files but cannot view them).

SUMMARY STATEMENT

Provided students have been thoroughly versed in business terminology via classroom instrurtion and the use of the user activity sheets, this simulation provides an interesting application of basic math concepts and business decision making skills.

STATUS

"The Whatsit Corporation" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $49.00 U.S. (1984) from Sunburst Communications at the address given at the beginning of the report. Sunburst Communications offers a lifetime warranty on their courseware products and will replace defective diskettes at no charge.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

MATH TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
ADDISON WESLEY	COMPUTER MATH GAMES1	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES2	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES3	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES4	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES5	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES6	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES7	1982.0	42
APPLE COMPUTER COMPANY	VOL. 1 GEOMETRY & MEASUREMENT	1980.0	41
APPLE COMPUTER COMPANY	VOL. 2 GEOMETRY & MEASUREMENT	1980.0	41
AQUARIUS	ALGEBRA 1	0.0	50
AQUARIUS	ALGEBRA 2	0.0	50
AQUARIUS	ALGEBRA 3	0.0	50
AQUARIUS	BAR & PICTURE GRAPHS	1982.0	41
AQUARIUS	FRACTIONS PERCENTS & DECIMALS	1982.0	41
AQUARIUS	PIE & LINE GRAPHS	1982.0	41
AQUARIUS	REAL COST	1982.0	41
AQUARIUS	UNDERSTANDING CHECKBOOKS STATEMENTS	1982.0	41
AQUARIUS	VOL. 1 SOLVING WORD PROBLEMS	1981.0	41
AQUARIUS	VOL. 2 SOLVING WORD PROBLEMS	1981.0	41
AUTOTELIC INSTRUCTIONAL MATERIALS	DIG MATH PROGRAM	0.0	40
AVANT GARDE CREATIONS	ARITHMETIC DRILL & PRACTICE	1983.0	41
AVANT GARDE CREATIONS	INTRO. ALGEBRA	1982.0	41
AVANT GARDE CREATIONS	LOGIC & EUCLIDEAN GEOMETRY	1983.0	41
AVANT GARDE CREATIONS	QUADRATIC & THE PARABOLA	1981.0	41
AVANT GARDE CREATIONS	REAL NUMBER SYSTEM	1981.0	41
AVANT GARDE CREATIONS	SPECIAL PRODUCTS & ALGEBRAIC FACTORS	1982.0	41
AVANT GARDE CREATIONS	STATISTICS	1981.0	41
BEHAVIORAL ENGINEERING	MATH STRATEGY	0.0	40
BERTAMAX	ESSENTIAL MATH	0.0	60
BERTAMAX	MATH FACTS GAMES 1	0.0	60
BERTAMAX	PROBLEM SOLVING 3	0.0	60
BERTAMAX	PROBLEM SOLVING 4	0.0	60
BERTAMAX	PROBLEM SOLVING 5	0.0	60
BERTAMAX	PROBLEM SOLVING 6	0.0	60
BIPACS	NUMBERS	0.0	41
BLS	ADDITION	0.0	40
BLS	ALGEBRA SEMESTERS 1 & 2	1982.0	41
BLS	ARITHMETIC FUNDAMENTALS	1981.0	41
BLS	BASIC STATISTICS	0.0	50
BLS	COMPLEX OPERATIONS	1981.0	41
BLS	CONTEMPORARY MATH	0.0	40
BLS	DECIMALS A REVIEW COURSE	1980.0	41
BLS	DIVISION	0.0	40
BLS	ELEM. NUMBER CONCEPTS	0.0	40
BLS	FRACTIONS A REVIEW COURSE	1981.0	41
BLS	INTRO. TO ALGEBRA	0.0	50
BLS	INTRO. TO MEASUREMENT	0.0	40
BLS	INTRO. TO THE METRIC SYSTEM	0.0	40
BLS	MULTIPLICATION	0.0	40

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
BLS	NATURAL NUMBERS & INTEGERS	1982.0	41
BLS	PERCENTAGE A REVIEW COURSE	1981.0	41
BLS	POLYNOMIALS	1982.0	41
BLS	QUADRATICS FACTORING RATIONAL EXPRESSIONS	1982.0	41
BLS	RATIO & PROPORTION	0.0	40
BLS	RATIONAL NUMBERS & REAL NUMBERS	1982.0	41
BLS	SCIENTIFIC MEASUREMENT SYSTEMS	0.0	50
BLS	SCIENTIFIC NOTATION & SIGNIFICANT FIGURES	0.0	50
BLS	SOLUTION OF FIRST DEGREE POLYNOMIAL EQUATIONS	1982.0	41
BLS	SUBTRACTION	0.0	40
BLS	TRIGONOMETRY	0.0	50
BLS	VARIABLES & SENTENCES	1982.0	41
CANADIAN CLASSROOM COMPUTERWARE	ADD/SUBT/MULT/DIV	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	CARDS	1984.0	41
CANADIAN CLASSROOM COMPUTERWARE	FOOTBALL	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	HORSE TARGET	0.0	40
CANADIAN CLASSROOM COMPUTERWARE	MATH TARGET	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	MEMORY CARDS	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	POLYGONS THE BIG 500	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	SNAIL RACE	1983.0	41
CANADIAN CLASSROOM COMPUTERWARE	STUDENT VS STUDENT	1983.0	41
CEEDE	COMPUTER MATH PART 1	0.0	60
CEEDE	COMPUTER MATH PART 2	0.0	60
CEEDE	COMPUTER MATH PART 3	0.0	60
CEEDE	COMPUTER MATH PART 4	0.0	60
CEEDE	COMPUTER MATH PART 5	0.0	60
CEEDE	COMPUTER MATH PART 6	0.0	60
CEEDE	COMPUTER MATH PART 7	0.0	60
CEEDE	ELECTRIC MATH PAPER	0.0	60
CEEDE	ESTIMATION & ROUNDING	0.0	60
CEEDE	MOUSE ADDITION	0.0	60
CEEDE	ONE ARMED BANDIT	0.0	60
CEEDE	PART 1 FRACTIONS BASIC LEVEL	0.0	60
CEEDE	PART 2 FRACTIONS BASIC LEVEL	0.0	60
CENTURION INDUSTRIES	COMPARING NUMBERS 1	0.0	60
CENTURION INDUSTRIES	COMPARING NUMBERS 2	0.0	60
CENTURION INDUSTRIES	COUNTING PATTERNS 1	0.0	60
CENTURION INDUSTRIES	COUNTING PATTERNS 2	0.0	60
CENTURION INDUSTRIES	MIXED MATH EXERCISES	0.0	60
CENTURION INDUSTRIES	NUMBER CONCEPTS	0.0	60
CENTURION INDUSTRIES	NUMBER PATTERNS	0.0	60
CENTURION INDUSTRIES	VOL. 1 PLACE VALUE RECOGNITION	0.0	60
CENTURION INDUSTRIES	VOL. 2 PLACE VALUE RECOGNITION	0.0	60
CHILDREN'S TELEVISION WORKSHOP	SPOTLIGHT	0.0	50
CLASSROOM COURSEWARE COMPANY	ADD & SUBTRACT	0.0	60
CLASSROOM COURSEWARE COMPANY	ADD A COLUMN	0.0	60
CLASSROOM COURSEWARE COMPANY	ALGEBRA PRACTICE	0.0	60
CLASSROOM COURSEWARE COMPANY	AREAS	0.0	60
CLASSROOM COURSEWARE COMPANY	BEFORE AFTER	0.0	60
CLASSROOM COURSEWARE COMPANY	BEGINNING FRACTIONS	0.0	60

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
CLASSROOM COURSEWARE COMPANY	BOX ADD	0.0	60
CLASSROOM COURSEWARE COMPANY	CHANGE	0.0	60
CLASSROOM COURSEWARE COMPANY	CHANGE 2	0.0	60
CLASSROOM COURSEWARE COMPANY	COMMON DENOMINATORS	0.0	60
CLASSROOM COURSEWARE COMPANY	COMPARING FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	COUNTING	0.0	60
CLASSROOM COURSEWARE COMPANY	DECIMALS TO FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	EQUAL FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	EXPAND COMPRESS VALUE	0.0	60
CLASSROOM COURSEWARE COMPANY	FACTOR PRACTICE	0.0	60
CLASSROOM COURSEWARE COMPANY	FACTORS	0.0	60
CLASSROOM COURSEWARE COMPANY	FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	GEOMETRIC SHAPES	0.0	60
CLASSROOM COURSEWARE COMPANY	GRAPHING	0.0	60
CLASSROOM COURSEWARE COMPANY	HOW TO DIVIDE	0.0	60
CLASSROOM COURSEWARE COMPANY	LESS EQUAL GREATER	0.0	60
CLASSROOM COURSEWARE COMPANY	LESS MORE	0.0	60
CLASSROOM COURSEWARE COMPANY	LITTLE GRAPH	0.0	60
CLASSROOM COURSEWARE COMPANY	LOWEST COMMON MULTIPLE	0.0	60
CLASSROOM COURSEWARE COMPANY	MATH FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	MATH GENERAL	0.0	60
CLASSROOM COURSEWARE COMPANY	MISSING NUMBER	0.0	60
CLASSROOM COURSEWARE COMPANY	MULT TABLES	0.0	60
CLASSROOM COURSEWARE COMPANY	NUMBER LINE	0.0	60
CLASSROOM COURSEWARE COMPANY	NUMBER NAME	0.0	60
CLASSROOM COURSEWARE COMPANY	NUMBER PROPERTIES	0.0	60
CLASSROOM COURSEWARE COMPANY	ODD EVEN	0.0	60
CLASSROOM COURSEWARE COMPANY	ONE TO NINE	0.0	60
CLASSROOM COURSEWARE COMPANY	PERCENT	0.0	60
CLASSROOM COURSEWARE COMPANY	PERIMETER & AREA	0.0	60
CLASSROOM COURSEWARE COMPANY	PLACE VALUE	0.0	60
CLASSROOM COURSEWARE COMPANY	PRIME NUMBERS	0.0	60
CLASSROOM COURSEWARE COMPANY	PROBABILITY	0.0	60
CLASSROOM COURSEWARE COMPANY	REDUCE FRACTIONS	0.0	60
CLASSROOM COURSEWARE COMPANY	RIGHT TO LEFT	0.0	60
CLASSROOM COURSEWARE COMPANY	ROUNDING	0.0	60
CLASSROOM COURSEWARE COMPANY	SMALL LARGE SETS	0.0	60
CLASSROOM COURSEWARE COMPANY	SQUARE & INTEGRAL ROOTS	0.0	60
CLASSROOM COURSEWARE COMPANY	SUBTRACTION WITH BORROWING	0.0	60
COLORADO CYPHERNETICS	MATH MASTERY	0.0	40
COMPAK	MATHEMATICS DRILL AND PRACTICE	1981.0	40
COMPUTATIONS	SCHOOLHOUSE	0.0	42
COMPUTATIONS	SOCCER MATH	0.0	41
COMPUTER ASSISTED INSTRUCTION	MATH EFFICIENCY SYSTEM	1984.0	41
COMPUTER COURSEWARE SERVICES	ARITHMETIC DRILL	1982.0	41
CONDUIT	DISCOVERY LEARNING IN TRIGONOMETRY	1982.0	41
CONDUIT	SURFACES	1982.0	70
CONTROL DATA CORPORATION	DECIMALS	1982.0	43
CONTROL DATA CORPORATION	FRACTIONS	1982.0	41
CONTROL DATA CORPORATION	WHOLE NUMBERS	1982.0	43

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PUBLISHER	TITLE	CPYRT.	CODE
COPP CLARK	INTRO. TO GRAND TOUR: MICROMATH	0.0	60
CRAIG	ELEMENTARY MATH PRACTICE	1983.0	41
CREATIVE PUBLICATIONS	MATH STRATEGY LINEAR SEARCH GAMES	0.0	40
CUISENAIRE COMPANY OF AMERICA	BUILDING ESTIMATION SKILLS	1983.0	42
CUISENAIRE COMPANY OF AMERICA	GEOMETRY & MEASUREMENT	1982.0	42
CUISENAIRE COMPANY OF AMERICA	MATH IDEAS WITH BASE TEN BLOCKS	1983.0	42
CYGNUS SOFTWARE	METRIC SYSTEM TUTOR	0.0	60
DAD'S COMPUTING	MATH MAZE	0.0	60
DATA COMMAND	SHIPSHAPE	0.0	40
DESIGNWARE	MATH MAZE	1963.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	PIRATE & ROUNDING	1983.0	41
DYNACOMP	TEACHER'S AIDE	0.0	60
EDUCATIONAL ACTIVITIES	ALGEBRAIC EXPRESSIONS	1982.0	41
EDUCATIONAL ACTIVITIES	AREAS OF TRIANGLES & GEOMETRY	0.0	60
EDUCATIONAL ACTIVITIES	CIRCLES	0.0	60
EDUCATIONAL ACTIVITIES	COMPUSOLVE	0.0	60
EDUCATIONAL ACTIVITIES	FUNDAMENTALS OF GEOMETRY	0.0	60
EDUCATIONAL ACTIVITIES	GRAPHING	1981.0	41
EDUCATIONAL ACTIVITIES	GRAPHING EXPONENTIAL FUNCTIONS	0.0	60
EDUCATIONAL ACTIVITIES	INTRO. TO DECIMALS	1980.0	41
EDUCATIONAL ACTIVITIES	INTRO. TO MATH ON A COMPUTER	2.0	41
EDUCATIONAL ACTIVITIES	LONG DIVISION	1982.0	42
EDUCATIONAL ACTIVITIES	MATH BASEBALL	0.0	60
EDUCATIONAL ACTIVITIES	MATH CONQUEROR	0.0	60
EDUCATIONAL ACTIVITIES	MATH FOR EVERYDAY LIVING	1982.0	41
EDUCATIONAL ACTIVITIES	MATH INVADERS	1982.0	41
EDUCATIONAL ACTIVITIES	MISSING MATH FACTS	1980.0	41
EDUCATIONAL ACTIVITIES	PERCENTAGES	1982.0	41
EDUCATIONAL ACTIVITIES	PERPLEXITY	0.0	60
EDUCATIONAL ACTIVITIES	SALINA MATH GAMES	0.0	60
EDUCATIONAL ACTIVITIES	SIMPLE ALGEBRAIC EQUATIONS	0.0	60
EDUCATIONAL ACTIVITIES	SOLVING EQUATIONS	1981.0	41
EDUCATIONAL ACTIVITIES	VOL. 1 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 1 READ & SOLVE MATH PROBLEMS	1981.0	41
EDUCATIONAL ACTIVITIES	VOL. 2 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 2 READ & SOLVE MATH PROGRAMS	0.0	40
EDUCATIONAL ACTIVITIES	VOL. 3 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 4 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 5 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 6 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL COURSEWARE	MATH DRILL	0.0	50
EDUCATIONAL DESIGN	TUTORIAL ARITHMETIC SYSTEMS	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	METRIC SYSTEM TUTOR	1982.0	41
EDUCATIONAL MICRO SYSTEMS	FRACTIONS & MIXED NUMBER ARITHMETIC	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER ADDITION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER DIVISION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER MULTIPLICATION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER SUBTRACTION	1980.0	41
EDUCATIONAL SOFTWARE CONSULTANTS	FRAXPRAC	0.0	40
EDUCATIONAL TEACHING AIDS	MICRO MATH	1982.0	41

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
EDUSOFT	FRACTION MIXED NUMBER RECOGNITION	1982.0	41
EDUSOFT	PLOT GUESS THE RULE	1982.0	42
EDUSOFT	SPEED DRILL NUMBER LINE	1982.0	50
EDUTECH	GRAPHS	1981.0	41
EDUTECH	TIME RATE DISTANCE	1981.0	41
EDUTEK	BASIC ARITHMETIC SKILLS	0.0	60
EDUTEK	COUNT TO 10	0.0	60
EDUTEK	COUNTING BY __	0.0	60
EDUTEK	COUNTING FUN	0.0	60
EDUTEK	COUNTING NUMBERS LESS THAN 101	0.0	60
ELECTRONIC COURSEWARE SYSTEMS	ELEMENTS OF MATH	1982.0	41
ENABLE COMPUTER SOFTWARE	MATH DRILL	0.0	41
ENCYCLOPAEDIA BRITANNICA	MATH SKILLS ELEM. LEVEL	1983.0	41
ENCYCLOPAEDIA BRITANNICA	MATH SKILLS JUNIOR HIGH LEVEL	1983.0	41
FULLMER & ASSOCIATES	DIVISION WITH ONE DIGIT DIVISORS	0.0	60
GEORGE EARL PUBLISHING	LESSONS IN ALGEBRA	1981.0	43
H B SOFTWARE	DOMINO GROUPING	1983.0	41
H B SOFTWARE	PLACE VALUE	0.0	60
H B SOFTWARE	PRIMARY MATH 1	1983.0	41
H B SOFTWARE	PRIMARY MATH 2	1983.0	41
H B SOFTWARE	REGROUPING	1983.0	41
H.C. WARD CO	BASIC MATH SKILL SERIES	1980.0	41
HARTLEY COURSEWARE	BINARY MATH	1984.0	41
HARTLEY COURSEWARE	EXPANDED NOTATION	0.0	60
HARTLEY COURSEWARE	INTEGERS/EQUATIONS I & II	1983.0	43
HARTLEY COURSEWARE	MATH CONCEPTS I & II	1983.0	43
HARTLEY COURSEWARE	METRIC SKILLS I & II	1983.0	42
HARTLEY COURSEWARE	MONEY MONEY	1982.0	41
HARTLEY COURSEWARE	NUMBER WORDS LEV. 1	1981.0	43
HARTLEY COURSEWARE	NUMBER WORDS LEV. 2	1981.0	42
HARTLEY COURSEWARE	PRESCRIPTIVE MATH DRILL	1981.0	41
HEATH	GRABIT FACTORY	0.0	60
HEATH	MATH MAZE	1983.0	41
HEATH	PICK THE NUMBERS	0.0	60
HEATH	THE SWEET SHOPPE	0.0	60
HEATH	TRAP-A-ZOID	0.0	60
HEINEMANN COMPUTERS IN EDUCATION	APPROXIMATION ESTIMATION & STANDARD FORM	1982.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 1	1984.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 2	1984.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 3	1984.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 4	1984.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 5	1984.0	41
HOLT RINEHART & WINSTON	MATHFINDER GRADE 6	1984.0	41
IDEAL SCHOOL SUPPLY	MAGIC GRID	1980.0	41
INDIAN HEAD SOFTWARE	DIVISION FACTS	1980.0	42
INDIAN HEAD SOFTWARE	FRACT - DEC - %	1983.0	41
INDIAN HEAD SOFTWARE	MULTIPLICATION FACTS	1979.0	42
INDIAN HEAD SOFTWARE	MYSTERY FUNCTION	1980.0	41
INDIAN HEAD SOFTWARE	PERCENT PROBLEMS	1979.0	41
INDIAN HEAD SOFTWARE	PLACE VALUE	1979.0	41

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
INDIAN HEAD SOFTWARE	PRIME FACTOR	1979.0	41
INDIAN HEAD SOFTWARE	REDUCING FRACTIONS	1979.0	42
INFORMATICS SOFTWARE	ARITHMETIC AIDS	3.1	42
INFORMATICS SOFTWARE	MOTION GEOMETRY	0.0	60
INFORMATICS SOFTWARE	TRANSFORMATION GEOMETRY	0.0	60
INTELLECTUAL SOFTWARE	ALGEBRA WORD PROBLEMS	1983.0	41
INTELLECTUAL SOFTWARE	ANALYTICAL REASONING	0.0	40
INTELLECTUAL SOFTWARE	AVERAGES	0.0	40
INTELLECTUAL SOFTWARE	BASES OTHER THAN TEN	1983.0	41
INTELLECTUAL SOFTWARE	BUZZ BANG HARVEY	1984.0	41
INTELLECTUAL SOFTWARE	EQUATIONS 1	1983.0	41
INTELLECTUAL SOFTWARE	EQUATIONS 2	0.0	40
INTELLECTUAL SOFTWARE	FACTORING GAME	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 1	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 2	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 3	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 4	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 5	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 6	0.0	40
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 7	1983.0	41
INTELLECTUAL SOFTWARE	MATH WORD PROBLEMS 8	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 1	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 2	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 3	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 4	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 5	0.0	40
INTELLECTUAL SOFTWARE	MATHEMATICS GRADE 6	0.0	40
INTELLECTUAL SOFTWARE	POWERS & ROOTS	0.0	40
INTELLECTUAL SOFTWARE	PRACTICAL ALGEBRA SERIES	0.0	40
INTELLECTUAL SOFTWARE	RATIOS & PROPORTIONS	1983.0	41
INTELLECTUAL SOFTWARE	REAL NUMBER SYSTEM	0.0	40
INTELLECTUAL SOFTWARE	ROUNDING & ESTIMATION	0.0	40
INTELLECTUAL SOFTWARE	SCIENTIFIC NOTATION	0.0	40
INTELLECTUAL SOFTWARE	SPECIAL TOPICS IN MATHEMATICS	0.0	40
INTELLECTUAL SOFTWARE	SPORTS PROBLEMS 1	0.0	40
INTELLECTUAL SOFTWARE	SPORTS PROBLEMS 2	0.0	40
INTELLECTUAL SOFTWARE	SPORTS PROBLEMS 3	1983.0	41
INTELLECTUAL SOFTWARE	SYMBOLS & SETS	0.0	40
INTELLECTUAL SOFTWARE	TRIANGLES	1983.0	41
INTERLEARN	PLACE VALUE PLACE	1983.0	41
INTERLEARN	SHARK GAMES	1983.0	41
KRELL SOFTWARE	LINEAR EQUATIONS	0.0	60
KRELL SOFTWARE	OPERATIONS & PROCESSES	0.0	60
KRELL SOFTWARE	VOL 1 LANGUAGE OF MATH & MATH PROBLEMS	0.0	60
KRELL SOFTWARE	VOL 2 LANGUAGE OF MATH & MATH PROBLEMS	0.0	60
LAWRENCE HALL OF SCIENCE	NUMBERS	0.0	60
LEARNING CLINIC	WORDS & NUMBERS	1982.0	41
LEARNING WELL	SPACE MATH	1983.0	41
LOCUS SYSTEMS	ARITHMETIC	1983.0	41
LOVE	BASIC SKILLS IN ADDITION	0.0	60

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
LOVE	BASIC SKILLS IN DIVISION	0.0	60
LOVE	BASIC SKILLS IN MULTIPLICATION	0.0	60
LOVE	BASIC SKILLS IN SUBTRACTION	0.0	60
MANITOBA COMPUTER ASSISTED LEARN	DISK A1	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A2	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A3	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A4	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A5	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN.	DISK A6	0.0	60
MANITOBA COMPUTER ASSISTED LEARN.	DISK A7	0.0	60
MATH SOFTWARE	JUNIOR HIGH PACKAGE	1981.0	42
MATHWARE (MATHCITY)	BASIC MATH SYSTEMS	1981.0	41
MCE	BECOMING AN INFORMED SHOPPER	0.0	60
MCE	BUYING WISELY	0.0	60
MCE	CASH VERSUS CREDIT BUYING	0.0	60
MCE	FINANCING A CAR	0.0	60
MCE	INCOME MEETS EXPENSES	1980.0	41
MCE	MIND CASTLE 1	0.0	60
MCE	MIND CASTLE 2	0.0	60
MCE	PROBLEM SOLVING PROCESS	0.0	60
MCE	SOLVING ADDITION & MULTIPLICATION PROBLEMS	0.0	60
MCE	SOLVING MULTIPLE STEP PROBLEMS	0.0	60
MCE	SOLVING SUBTRACTION & DIVISION PROBLEMS	0.0	60
MCE	UNDERSTANDING SALES BUYING	0.0	60
MCE	YOU CAN BANK ON IT	1981.0	41
MCGRAW HILL RYERSON	MATH REGROUPING GAMES	1982.0	41
MCGRAW HILL RYERSON	MATH WORD GAMES	1982.0	41
MEDIA MATERIALS	BANKING & CONSUMER TRANSACTIONS	1983.0	41
MEDIA MATERIALS	CAR OWNER'S MANUAL FOR BETTER MATH SKILLS	1983.0	41
MEDIA MATERIALS	COMPUTING YOUR INCOME	0.0	60
MEDIA MATERIALS	DIVE INTO DATA	0.0	60
MEDIA MATERIALS	ESSENTIAL MATH SKILLS FOR COMPUTING TAXES	1983.0	41
MEDIA MATERIALS	GET YOUR SIGNALS STRAIGHT	0.0	60
MEDIA MATERIALS	HOME RUN LOGIC	0.0	60
MEDIA MATERIALS	MATH & YOUR PERSONAL FINANCES	1983.0	41
MEDIA MATERIALS	MATH AROUND THE HOUSE	1983.0	41
MEDIA MATERIALS	MATH IN THE MARKETPLACE	0.0	60
MEDIA MATERIALS	MATH IN YOUR INSURANCE POLICIES	1983.0	41
MEDIA MATERIALS	MATH SKILLS AT WORK	0.0	60
MEDIA MATERIALS	MATH SKILLS FOR BANKING TRANSACTIONS	0.0	60
MEDIA MATERIALS	ON THE ROAD WITH BASIC MATH SKILLS	1983.0	41
MEDIA MATERIALS	SHOOT FOR SOLUTIONS	0.0	60
MEDIA MATERIALS (MILTON BRADLEY)	DECIMAL SKILLS	1982.0	41
MEDIA MATERIALS (MILTON BRADLEY)	DIVISION SKILLS	1982.0	42
MEDIA MATERIALS (MILTON BRADLEY)	MIXED NUMBERS	1982.0	41
MICRO LEARNINGWARE	EDUCATIONAL PACKAGE 3	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 1	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 2	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 3	0.0	60
MICRO LEARNINGWARE	TEDDY BEARS COUNTING FUN	0.0	60

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PUBLISHER	TITLE	CPYRT.	CODE
MICRO POWER & LIGHT	DIPT	1980.0	41
MICRO POWER & LIGHT	FACTORING	1981.0	41
MICRO POWER & LIGHT	GOING TOGETHER	1.2	41
MICRO POWER & LIGHT	NORMAL DEVIATION	0.0	40
MICRO POWER & LIGHT	OFF CENTER	1980.0	41
MICRO POWER & LIGHT	OFF LINE	1.2	41
MICRO POWER & LIGHT	ON THE AVERAGE	1980.0	41
MICRO POWER & LIGHT	PROOFS & PROPERTIES	1980.0	41
MICRO POWER & LIGHT	PYTHAGOREAN PROOFS	1980.0	41
MICRO POWER & LIGHT	RIEMANN INTEGRAL	1980.0	41
MICRO POWER & LIGHT	WHAT'S THE SCORE	1.2	41
MICRO PROGRAM DESIGNS	MATH ALERT	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 1 DISK 1	1983.0	42
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 1 DISK 2	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 1 DISK 3	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 1 DISK 4	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 2 DISK 1	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 2 DISK 2	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	ALGEBRA 2 DISK 3	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	GEOMETRY DISK 1	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	GEOMETRY DISK 2	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	GEOMETRY DISK 3	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 1	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 2	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 3	1983.0	42
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 4	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 5	1983.0	42
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 6	1983.0	41
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 7	1983.0	42
MICROCOMPUTER CURRICULUM PROJECT	MIDDLE SCHOOL DISK 8	1983.0	41
MICROCOMPUTER WORKSHOPS	123 DIGIT MULTIPLICATION	0.0	40
MICROCOMPUTER WORKSHOPS	ADDING DECIMALS	1984.0	42
MICROCOMPUTER WORKSHOPS	ADDING FRACTIONS	1982.0	42
MICROCOMPUTER WORKSHOPS	ADDITION WITH CARRY	0.0	60
MICROCOMPUTER WORKSHOPS	DIVIDING DECIMALS	1984.0	42
MICROCOMPUTER WORKSHOPS	LONG DIVISION	0.0	60
MICROCOMPUTER WORKSHOPS	MULTIPLYING DECIMALS	1984.0	42
MICROCOMPUTER WORKSHOPS	ORDER OF OPERATIONS	1982.0	42
MICROCOMPUTER WORKSHOPS	SUBTRACTING DECIMALS	1984.0	42
MICROCOMPUTER WORKSHOPS	SUBTRACTION	1981.0	40
MICROCOMPUTERS IN EDUCATION	BASEBALL	1981.0	41
MICROCOMPUTERS IN EDUCATION	GOLF	1981.0	41
MICROCOMPUTERS IN EDUCATION	MATH DRILL	1981.0	41
MICROCOMPUTERS IN EDUCATION	STARS	1981.0	41
MICROCOMPUTERS IN EDUCATION	ZAP MULT.	1981.0	41
MICROMATICS	INITIAL TEACHING SET	0.0	50
MICROMATICS	SELF CONTAINED INSTRUCTIONAL SET	0.0	50
MICROMATICS	STRUCTURE PACK	0.0	50
MICROPHYS PROGRAMS	CALCULUS 1 DISKETTE	0.0	60
MICROPHYS PROGRAMS	JUNIOR HIGH MATH DISKETTE	0.0	60

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
MICROPHYS PROGRAMS	SENIOR HIGH MATH 1 DISKETTE	0.0	60
MICROPHYS PROGRAMS	SENIOR HIGH MATH 2 DISKETTE	0.0	60
MILLIKEN PUBLISHING	ALIENCOUNTER FACE FLASH	1982.0	41
MILLIKEN PUBLISHING	FRENZY FLIP FLOP	1982.0	42
MILLIKEN PUBLISHING	GULP ARROW GRAPHICS	1982.0	41
MILLIKEN PUBLISHING	JAR GAME CHAOS	1982.0	41
MIND	BASIC MATH	0.0	60
MIND	DECIMALS	0.0	60
MIND	FRACTIONS	0.0	60
MIND	INTERMEDIATE MATH	0.0	60
MINDSCAPE SOFTWARE	AWESOME ADDITION	0.0	41
MINDSCAPE SOFTWARE	AWESOME DIVISION	0.0	41
MINDSCAPE SOFTWARE	AWESOME MULTIPLICATION	0.0	41
MINDSCAPE SOFTWARE	AWESOME SUBTRACTION	0.0	41
NTS	GATHERING SPEED SET1	1981.0	41
NTS	GATHERING SPEED SET2	1981.0	41
NTS	GETTING THE BASICS 1	1980.0	41
NTS	GETTING THE BASICS 2	1980.0	41
NTS	MATH LAB 1 TAKING INVENTORY	1981.0	41
NTS	MOVING ON SET 1	1982.0	41
NTS	MOVING ON SET 2	1980.0	41
NTS	MOVING ON SET 3	0.0	50
NTS	STARTING OUT SET 1	1980.0	41
NTS	STARTING OUT SET 2	1980.0	41
ORANGE CHERRY MEDIA	ADDITION & SUBTRACTION	0.0	50
ORANGE CHERRY MEDIA	BEGINNING MATH CONCEPTS	0.0	50
ORANGE CHERRY MEDIA	DIVISION OF WHOLE NUMBERS	0.0	50
ORANGE CHERRY MEDIA	INTERMEDIATE MATH SKILLS	0.0	50
ORANGE CHERRY MEDIA	MULTIPLICATION OF WHOLE NUMBERS	0.0	50
ORANGE CHERRY MEDIA	TELLING TIME COMPUTER SET	0.0	40
ORANGE CHERRY MEDIA	USING MONEY & MAKING CHANGE	0.0	40
PEACHTREE SOFTWARE (EDUWARE)	ALGEBRA 1	1.3	42
PEACHTREE SOFTWARE (EDUWARE)	ALGEBRA 2	1981.0	41
PEACHTREE SOFTWARE (EDUWARE)	ALGEBRA 3	1982.0	41
PEACHTREE SOFTWARE (EDUWARE)	ARITHMETIC SKILLS	1980.0	41
PEACHTREE SOFTWARE (EDUWARE)	COUNTING BEE	1.1	50
PEACHTREE SOFTWARE (EDUWARE)	DECIMALS	3.0	41
PEACHTREE SOFTWARE (EDUWARE)	FRACTIONS	1980.0	42
PEACHTREE SOFTWARE (EDUWARE)	INTRODUCTION TO COUNTING	1983.0	41
PERSONAL COMPUTER ART	MATH 1	0.0	60
PERSONAL COMPUTER ART	SCIMATH	0.0	60
PINELLAS COUNTY SCHOOL SYSTEM	INSTRUCTIONAL COMPUTING IN ALGEBRA II	1981.0	40
PMI	ANIMATED ARITHMETIC	1982.0	41
PMI	MASTER MATH	1981.0	41
PROGRAM DESIGN	ADDITION WITH CARRYING	0.0	60
PROGRAM DESIGN	CASH REGISTER	0.0	60
PROGRAM DESIGN	NUMBER SERIES	0.0	60
PROGRAM DESIGN	QUANTITATIVE COMPARISONS	0.0	60
PSYCHOTECHNICS	TELEMATH -TRIAL SIZE	1983.0	41
PSYCHOTECHNICS	TELEMATH VOLUME 1	1983.0	40

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
QUALITY EDUCATIONAL DESIGNS	ARITHMAGIC	1981.0	42
QUALITY EDUCATIONAL DESIGNS	DECIMALS	1981.0	42
QUALITY EDUCATIONAL DESIGNS	FACTORING WHOLE NUMBERS	1982.0	42
QUALITY EDUCATIONAL DESIGNS	FRACTIONS	1979.0	42
QUINTE LEARNING CENTRE	MIGHTY MATH	1982.0	41
RANDOM HOUSE	BASIC MATH FACTS & GAMES	1981.0	41
RANDOM HOUSE	BASIC MATH FACTS DRILL	1981.0	41
RANDOM HOUSE	BASIC MATH FLASH FACTS	1981.0	41
READER'S DIGEST SERVICES	LEV. 1 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 2 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 3 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 4 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1991.0	41
READER'S DIGEST SERVICES	LEV. 5 & 6 PROBLEM SOLVING EDUDISKS	0.0	60
READER'S DIGEST SERVICES	LEV. 5 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 6 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 7 & 8 PROBLEM SOLVING EDUDISKS	0.0	60
READER'S DIGEST SERVICES	LEV. 7 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
RESTON PUBLISHING	MULTIPLOY	1982.0	41
RIGHT ON PROGRAMS	ADDITION & SUBTRACTION	1981.0	41
RIGHT ON PROGRAMS	FRACTIONS	1981.0	41
RIGHT ON PROGRAMS	MATCHING & USING NUMBERS	1981.0	41
RIGHT ON PROGRAMS	MATCHING GEOMETRIC FIGURES	1981.0	41
RIGHT ON PROGRAMS	MATH MEASUREMENTS	1981.0	41
RIGHT ON PROGRAMS	MONEY	1981.0	41
RIGHT ON PROGRAMS	MULTIPLICATION & DIVISION	1981.0	41
RIGHT ON PROGRAMS	PROBLEM SOLVING	1981.0	41
RIGHT ON PROGRAMS	SETS	1981.0	41
RIGHT ON PROGRAMS	SIMPLE MULTIPLICATION & DIVISION	1981.0	41
RIGHT ON PROGRAMS	TELLING TIME	1981.0	41
SCANDURA TRAINING SYSTEMS	MICROTUTOR 2 ARITHMETIC SYSTEMS	0.0	60
SCHOOL COURSEWARE JOURNAL	COINS	1982.0	41
SCHOOL COURSEWARE JOURNAL	CONCENTRATION	1982.0	41
SCHOOL COURSEWARE JOURNAL	DECIMAL ESTIMATION	1981.0	42
SCHOOL COURSEWARE JOURNAL	DIVISION DRILL	1981.0	41
SCHOOL COURSEWARE JOURNAL	SAMPLING	1981.0	41
SCHOOL COURSEWARE JOURNAL	SIGN DRILL	1982.0	43
SCHOOLHOUSE SOFTWARE	BLAST OFF	0.0	40
SCHOOLHOUSE SOFTWARE	BUG RACE	0.0	40
SCHOOLHOUSE SOFTWARE	CANNON ATTACK (DECIMALS)	0.0	40
SCHOOLHOUSE SOFTWARE	CANNON ATTACK (WHOLENUMBERS)	1982.0	41
SCHOOLHOUSE SOFTWARE	CASTLE	0.0	40
SCHOOLHOUSE SOFTWARE	FRANK	0.0	40
SCHOOLHOUSE SOFTWARE	GENERAL MATH QUIZ	1982.0	41
SCHOOLHOUSE SOFTWARE	LIGHTNING	0.0	40
SCHOOLHOUSE SOFTWARE	MY BUG	0.0	40
SCHOOLHOUSE SOFTWARE	PILOT	0.0	40
SCHOOLHOUSE SOFTWARE	SPEEDWAY	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (CIRCLES)	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (ELEMENTS)	0.0	40
SCHOOLHOUSE SOFTWARE	TARGET PRACTICE	0.0	40

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70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
T.H.E.S.I.S.	BIG MATH ATTACK	0.0	40
TEACH YOURSELF BY COMPUTER	ADDITION FACTS	0.0	40
TEACH YOURSELF BY COMPUTER	DIVISION FACTS	0.0	40
TEACH YOURSELF BY COMPUTER	MULTIPLICATION FACTS	0.0	40
TEACH YOURSELF BY COMPUTER	SUBTRACTION FACTS	0.0	40
TECK	DRILL 2	0.0	60
TELEPHONE SOFTWARE CONNECTION	MATH TUTOR	0.0	60
TELEPHONE SOFTWARE CONNECTION	TIME TUTOR	0.0	60
THE PROFESSOR	COUNTING PLUS	1982.0	41
THE PROFESSOR	SUBTRACTION MINUS	1983.0	41
UNICORN TREASURES	RACE CAR 'RITHMETIC	0.0	60
UNICORN TREASURES	SHIPS AHOY	0.0	60
UNICORN TREASURES	TEN LITTLE ROBOTS	0.0	60
VENTURA EDUCATIONAL SYSTEMS	GEOART	0.0	40
WADSWORTH ELECTRONIC	EQUATIONS & INEQUALITIES	1983.0	41
WADSWORTH ELECTRONIC	EXPONENTIAL & LOGARITHMIC FUNCTIONS	1983.0	41
WADSWORTH ELECTRONIC	FUNCTIONS	1983.0	41
WADSWORTH ELECTRONIC	FUNDAMENTAL CONCEPTS OF ALGEBRA	1983.0	41
WADSWORTH ELECTRONIC	POLYNOMIAL & RATIONAL FUNCTIONS CONIC SECTIONS	1983.0	41
WADSWORTH ELECTRONIC	SYSTEMS OF EQUATIONS & INEQUALITIES	1983.0	41
WEEKLY READER FAMILY SOFTWARE	TABLES & GRAPHS 8533	0.0	60
WEEKLY READER FAMILY SOFTWARE	TABLES & GRAPHS 8542	0.0	60
WISE OWL WORKSHOPS	FLASH CARDS	1981.0	41

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
SCHOOLHOUSE SOFTWARE	U BOAT	1982.0	41
SCIENCE RESEARCH ASSOCIATES	ARITHMETIC GAMES	1980.0	41
SCIENCE RESEARCH ASSOCIATES	ESTIMATION	1983.0	42
SCIENCE RESEARCH ASSOCIATES	FACT TRACK	1981.0	41
SCOTT FORESMAN	FROG JUMP	1985.0	41
SCOTT FORESMAN	PICTURE PARTS	1985.0	41
SCOTT FORESMAN	SPACE JOURNEY	1984.0	41
SCOTT FORSEMAN	DIVISION 1	0.0	60
SCOTT FORSEMAN	MATH ACTION GAME SERIES	0.0	41
SCOTT FORSEMAN	MULTIPLICATION 1	0.0	60
SCOTT FORSEMAN	NUMBER BOWLING	0.0	40
SCOTT FORSEMAN	NUMERATION 1	0.0	60
SCOTT FORSEMAN	NUMERATION 2	0.0	60
SCOTT FORSEMAN	PYRAMID PUZZLER	0.0	40
SCOTT FORSEMAN	STAR MAZE	0.0	40
SCOTT FORSEMAN	VOL. 1 ADDITION & SUBTRACTION	0.0	60
SCOTT FORSEMAN	VOL. 2 ADDITION & SUBTRACTION	0.0	60
SETZER EDUCATIONAL SERVICES	SUPERMATH	0.0	40
SHERIDAN COLLEGE	MICROMATH	1982.0	41
SIERRA	LEARNING WITH LEEPER	0.0	40
SOFTWARE SPIRIT	JUNIOR MATH	1981.0	41
SOMERVILLE, FRANCIS	GIANT MATH SLATE	1983.0	41
SOUTHWEST EDPSYCH SERVICES	MATH MACHINE	1.2	42
SOUTHWEST EDPSYCH SERVICES	MATH WARS	1982.0	41
SPINNAKER SOFTWARE	SNOOPER TROOPS 1	0.0	60
SPINNAKER SOFTWARE	SNOOPER TROOPS 2	0.0	60
STATE UNIV. OF N.Y. (STONY BROOK)	MOTION MATH LAB	0.0	60
STERLING SWIFT PUBLISHING COMPANY	ARITH. CLASSROOM ADDITION	1982.0	41
STERLING SWIFT PUBLISHING COMPANY	ARITH. CLASSROOM DIVISION	1982.0	41
STERLING SWIFT PUBLISHING COMPANY	ARITH. CLASSROOM MULTIPLICATION	1982.0	41
STERLING SWIFT PUBLISHING COMPANY	ARITH. CLASSROOM SUBTRACTION	1982.0	41
STERLING SWIFT PUBLISHING COMPANY	FUNDAMENTALS OF MATH	1984.0	41
STOCKYARD MICROCOMPUTER SOFTWARE	INDIVIDUAL CORRECTIVE MATHEMATICS	0.0	60
SUNBURST COMMUNICATIONS	CHALLENGE MATH	1982.0	41
SUNBURST COMMUNICATIONS	PLAY THE RULES	0.0	60
SUNBURST COMMUNICATIONS	POLYNOMIAL PRACTICE USING TILES	1983.0	41
SUNBURST COMMUNICATIONS	SOLVING EQUATIONS & INEQUALITIES	1983.0	42
SUNBURST COMMUNICATIONS	SURVIVAL MATH	1982.0	41
SUNBURST COMMUNICATIONS	TOBBS LEARNS ALGEBRA	1983.0	41
SVE	CIRCLES	1982.0	41
SVE	FRACTIONS DECIMALS & PERCENT	0.0	60
SVE	GUINNESS PROBLEM AREAS IN MATH	0.0	60
SVE	MATRICES	0.0	60
SVE	PREALGEBRA 1	1983.0	41
SVE	PREALGEBRA 2	0.0	60
SVE	VOL. 1 DEVELOPMENT OF BASIC MATH SKILLS	1983.0	41
SVE	VOL. 1 TESTING BASIC MATH SKILLS	1983.0	41
SVE	VOL. 2 DEVELOPMENT OF BASIC MATH SKILLS	1983.0	41
SVE	VOL. 2 TESTING BASIC MATH SKILLS	1983.0	41
SVE	VOL. 3 DEVELOPMENT OF BASIC MATH SKILLS	1983.0	41

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INDEX DE MATHÉMATIQUES

APPROUVÉS

TITRE	EDITEUR	ANNÉE	STATUT	PAGE
Math-thématique 6	Houghton Mifflin	6e	Recommandé	Ma (Fr) 3

LISTE DES TITRES NON RECOMMANDÉS

Ma (Fr) 7

MATH-THÉMATIQUE 6

DESCRIPTION

Titre: Math-thématique 6
Auteur: Doug Super
Editeur: Houghton Mifflin Canada Ltd.
Source: 150, rue Steelcase ouest, Markham, Ontario, L3R 1B2
Matière: Mathématiques

Version: 1983
Langue d'affichage: Français
Coût: 225 $ (1984)
Tél.: (416) 475-1755
Utilisateurs: 6e année

Sujets: Logique, système métrique, estimations, opérations avec nombres entiers, décimales et fractions
Composantes: 3 disquettes et 3 disquettes de rechange, guide du maître (62 p.), fiches de travail et activités suggérées
Matériel requis: Apple II+/IIe/IIc, 48K, 1 unité de disque, moniteur couleur préférable
Disponibilité sur d'autres ordinateurs (pas d'évaluation): Commodore 64, IBM PC. Une version anglaise du programme est aussi disponible sur Apple.

OBJECTIFS

Développer et renforcer des stratégies de résolution de problèmes, donner une expérience dans l'estimation et le développement des concepts et renforcer les habiletés de base en mathématiques.

DESCRIPTION DU CONTENU PÉDAGOGIQUE

Cet ensemble comprend 15 programmes présentés sous forme de jeux. Chacune des activités vise à rencontrer certains objectifs reliés à un concept central d'une des unités du livre de l'élève "Houghton Mifflin Mathématique 6". Cet ensemble complète le programme et ne doit pas être utilisé seul.

L'organisation des jeux permet à l'élève ou au groupe d'élèves de jouer contre l'ordinateur ou entre eux. Plusieurs activités sont ouvertes, ce qui permet un travail à des niveaux variés de complexité. De plus, la résolution de problèmes par l'interaction des élèves en groupes est encouragée.

Voici les jeux qui se retrouvent dans le programme.

1. LE NOMBRE MYSTÈRE: Une comparaison des nombres décimaux exigeant une méthode de recherche et de déduction logique.
2. MASTER MATHS: Renforcement des opérations inverses et des habiletés de base en addition et en soustraction.
3. DANS LE MILLE: Estimations dans les multiplications de nombres entiers.
4. SOUQUE-À-LA-CORDE: Estimation dans les divisions de nombres entiers.
5. ZIGZAGS MÉTRIQUES: Estimation des longueurs en centimètres.
6. DOUBLE ÉNIGME: Relations entre diviseurs communs et multiplicateurs communs.
7. LA SONATE DES FRACTIONS: Comparaisons entre les fractions et les décimales.
8. LE JEU DU LABYRINTHE: Déterminer le produit d'une multiplication de nombres décimaux.
9. LE SENS DES POURCENTAGES: Trois stratégies d'estimation pour trouver le pourcentage de nombres entiers.
10. L'ÉCHELLE DES FRACTIONS: Multiplications, divisions et réductions de fractions.
11. SOUS TOUS LES ANGLES: Mesure des angles.
12. DÉPLACEMENTS: Pratiques qui permettent de faire glisser, renverser ou tourner des figures géométriques.
13. CROQUIS-PROGRAMME: Location de points et de trajectoires sur un plan.
14. LA CHASSE AUX FRACTIONS: Estimation dans le résultat d'additions ou de soustractions avec des fractions.
15. TIR AU BUT: Interprétation de distances sur un dessin fait à l'échelle.

L'ensemble propose aussi du matériel d'appui sous forme de fiches de travail ou d'activités pour chaque jeu.

ÉVALUATION DU CONTENU PÉDAGOGIQUE

Le contenu, l'ordre de présentation et le niveau de difficulté sont adaptés au programme d'études de la 6e année, à l'exception des programmes contenant des fractions qui seraient plus appropriés pour de l'enrichissement. De plus, le programme "Croquis-programme" est trop difficile pour la plupart des élèves de 6e année et un enseignement préalable devrait être donné aux élèves qui voudraient essayer ce programme.

Cet ensemble ne devrait pas être utilisé seul mais devrait être utilisé comme matériel complémentaire au manuel de l'élève de la 6e année de Houghton-Mifflin et comme tel, il répond très bien à ces objectifs.'

Les fiches de travail et les activités suggérées sont très bonnes et peuvent être utilisées comme activités complémentaires après l'utilisation du didacticiel ou comme activités préalables à l'utilisation du didacticiel comme leçon d'introduction aux activités qu'il y aura à faire avec l'ordinateur.

Le contenu est à date et sous forme métrique. Les programmes renforcent les stratégies de résolution de problèmes, les estimations et le développement d'habiletés de base de façon à intéresser et motiver l'élève.

DESCRIPTION DES TYPES D'INTERVENTION PÉDAGOGIQUE

L'interaction avec l'ordinateur consiste à faire des entrées relatives à des réponses que l'ordinateur exige, à la sélection de menus et au choix du nombre de joueurs. L'interaction parmi le groupe de joueurs peut être productive et y est encouragée.

Les techniques de rétroaction varient d'un programme à l'autre mais sont presques toutes présentées sous forme graphique avec l'aide de sons appropriés.

Un indice donnant à l'élève une idée de la proximité de sa réponse à la bonne réponse, une comparaison de l'exactitude d'une estimation, l'élimination ou l'addition d'obstacles, l'acquisition de points, la terminaison d'un tour, etc. sont des exemples de rétroaction.

La rétroaction positive sous forme de graphiques motive l'élève à rechercher la bonne réponse.

ÉVALUATION DES TYPES D'INTERVENTION PÉDAGOGIQUE

Les techniques d'enseignement utilisées dans ces programmes sont appropriées à la classe type de 6e année. Elles sont efficaces et stimulantes. Les élèves participent activement et peuvent se mesurer à d'autres élèves ou à l'ordinateur.

La rétroaction instantanée et l'absence de pression pour l'apprenant sont très appropriées.

Les graphiques, le texte et le son sont tous utilisés avantageusement. Par contre, on doit noter qu'aucune aide ou explication n'est donnée quand la réponse n'est pas bonne. Les élèves qui ont des difficultés avec les concepts ou les stratégies à utiliser peuvent ressentir de la frustration devant certains jeux. Comme il n'y a aucune explication du jeu sur la disquette, certains élèves peuvent se sentir frustrés lorsqu'ils essayent de jouer à un jeu pour la première fois.

DESCRIPTION DES CARACTÉRISTIQUES TECHNIQUES

Les graphiques sont une composante essentielle aux programmes. Les couleurs sont aussi utilisées mais un moniteur couleur n'est pas essentiel. Le son est optionnel et peut être contrôlé par l'enseignant/e.

ÉVALUATION DES CARACTÉRISTIQUES TECHNIQUES

La création technique des programmes à été très bien pensée. Les affichages à l'écran sont appropriés, exacts et généralement efficaces. Le texte est clair et facile à lire. En général, la transition d'un affichage à l'autre se fait très bien.

Les graphiques, la couleur et le son motivent l'élève. Le programme est facile d'utilisation et l'élève peut quitter un programme facilement.

DESCRIPTION DU MATÉRIEL D'APPUI

Le programme est accompagné d'un système de gestion pour l'enseignant/e qui lui permet d'utiliser ou non le son et de contrôler la sélection des programmes à utiliser par les élèves.

Le guide du maître (62 p.) contient des fiches de travail, des instructions pour l'utilisation des programmes, des suggestions d'activités pour la classe et décrit les objectifs de chaque programme.

ÉVALUATION DU MATÉRIEL D'APPUI

Le système de gestion est facile d'accès et d'utilisation. La documentation est bien organisée et il est facile de suivre les directives. Les fiches de travail sont étroitement reliées aux programmes de l'ordinateur et nous permettent de suivre facilement le progrès de l'élève.

SOMMAIRE

La force primordiale de cet ensemble réside dans le fait qu'il y a un effort soutenu dans le développement de stratégies de résolution de problèmes, de pensée logique et d'estimations. L'approche utilisée, c'est-à-dire, le jeu, intéresse et motive l'élève.

Le manque d'information donnée pour jouer le jeu est une faiblesse du programme. Ceci oblige l'enseignant/e à donner les instructions nécessaires avant que les élèves puissent se servir du programme. De plus, certains élèves auront de la difficulté à formuler les stratégies nécessaires pour la résolution des problèmes. Certains jeux offrent un défi de taille et le manque d'aide ou de rétroaction pourrait frustrer certains utilisateurs.

STATUT

L'ensemble "MATH-THÉMATIQUE 6", programmes d'activités mathématiques, est reconnu comme ressource pédagogique de statut "**recommandé**".

ACHAT

Les écoles de l' Alberta peuvent acheter cet ensemble du "School Book Branch" au coût approximatif de 150 $ (1985). Les disquettes fautives sous guarantie seront remplacées, sans frais, dans les 30 jours suivant l'achat. Il est à noter que cet ensemble contient des disquettes de rechange. Les disquettes qui ne peuvent plus être utilisées à cause d'un usage normal, peuvent être renvoyées au S.B.B. et remplacées au coût de 27 $ (approximativement). Il n'y a pas de temps limite sur cette offre. Chaque disquette a l'avantage de pouvoir être utilisée sur plus d'une machine à la fois, s'il n'y a qu'une seule activité qui est mise en action en même temps; par contre, cet usage est soumis aux lois qui régissent les droits d'auteur et toute licence ou entente acceptée lors de l'achat du matériel.

TITRES NON RECOMMANDÉS EN MATHÉMATIQUES

MAISON D'ÉDITION	TITRE	©	NO.
BIPACS	NUMBERS (FR)	0.0	41
CENTRE FRANCO-ONTARIEN	GRAPHIQUES À BANDE	0.0	60
CENTRE FRANCO-ONTARIEN	PARTIE-PRISE	0.0	60
CENTRE FRANCO-ONTARIEN	TRANS-FORMES	0.0	60
MANITOBA COMPUTER ASSISTED LEARN	DISQUE A1	0.0	40
MANITOBA COMPUTER ASSISTED LEARN	DISQUE A2	0.0	40
MANITOBA COMPUTER ASSISTED LEARN	DISQUE A3	0.0	40
MANITOBA COMPUTER ASSISTED LEARN	DISQUE A4	0.0	40
MANITOBA COMPUTER ASSISTED LEARN	DISQUE A5	0.0	40
MATRA HACHETTE	MATH 1	0.0	60
PUCE	LOGIQUE & MATH	1983.0	42
THE PROFESSOR	ARITHMETIQUE	0.0	41
THE PROFESSOR	COMPTADDITION	1982.0	42
THE PROFESSOR	CONCENTRATION	0.0	40
THE PROFESSOR	DÉCIMALES	0.0	41
THE PROFESSOR	FRACTIONS	0.0	41
THE PROFESSOR	SAVOIR COMPTER	1983.0	41
THE PROFESSOR	SOUSTRACTION MOINS	1983.0	41
THE PROFESSOR	SUITES DE NOMBRES	1982.0	41

40-43: RÉSULTAT D'ÉVALUATION DÉFAVORABLE
50: CET ARTICLE N'EST PLUS DISPONIBLE
60: IMPOSSIBILITÉ D'OBTENIR UNE COPIE POUR FIN D'ÉVALUATION
70: CONTENU NE COUVRE PAS LE PROGRAMME D'ÉTUDES DE L'ALBERTA

PROBLEM SOLVING INDEX

Evaluations of programs which focus on general problem solving skills may be found in the various subject area sections within this document. To assist teachers in finding such products, abstracts of these products have been included in this "Problem Solving" section. Please note that programs shown in this section focus on problem solving skills IN GENERAL and not on the solution of specific types of problems. Programs which provide drill in solving arithmetic word problems or drills on algebraic motion problems, for example, would be listed in the math section and are not included within this area.

Teachers wishing more information on any of these products will find the reference to the appropriate subject area in the abstract.

AUTHORIZED

TITLE	PUBLISHER	GRADES	STATUS	ABSTRACT PAGE	REPORT PAGE
Bertrude's Puzzles	The Learning Company	1 +	Supplementary	Prob 3	Ma 27
Gertrude's Secrets	The Learning Company	K - 4	Supplementary	Prob 3	Ma 29
Math Activities Courseware 5	Houghton Mifflin	5	Recommended	Prob 4	Ma 33
Math Activities Courseware 6	Houghton Mifflin	6	Recommended	Prob 4	Ma 35
Rocky's Boots	The Learning Company	3 +	Supplementary	Prob 5	Sc 13

UNDER THIRD STAGE REVIEW

TITLE	PUBLISHER	GRADES	STATUS	ABSTRACT PAGE	REPORT PAGE
Code Quest	Sunburst Communications	4 - 7	Still Under Review	Prob 7	Ma 57
Math Activities Courseware 3	Houghton Mifflin	3	Still Under Review	Prob 7	Ma 83
Math Activities Courseware 4	Houghton Mifflin	4	Still Under Review	Prob 8	Ma 87
Math Activities Courseware 7	Houghton Mifflin	7	Still Under Review	Prob 8	Ma 91
Math Activities Courseware 8	Houghton Mifflin	8	Still Under Review	Prob 9	Ma 95
Moptown Hotel	The Learning Company	3 +	Still Under Review	Prob 9	Ma 105
Moptown Parade	The Learning Company	1 - 4	Still Under Review	Prob 10	Ma 107
Spectrum: Patterns & Programs	Sunburst Communications	6 +	Still Under Review	Prob 10	Comp 15
The Factory	Sunburst Communications	4 - 9	Still Under Review	Prob 11	Ma 125
The King's Rule	Sunburst Communications	4 +	Still Under Review	Prob 11	Ma 127

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

Prob 13

GERTRUDE'S PUZZLES

DESCRIPTION

Title: Gertrude's Puzzles **Version:** 1982
Publisher: The Learning Company (Addison Wesley) **Cost:** $81.56 (1985)
Subject: Problem Solving **Users :** Ages 6 and up
Components: 1 diskette and backup, teacher guide (57p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional
Alberta Education Call No.: BC 177 G384p 1982

ABSTRACT

This diskette is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to solve problems with incomplete information and analyze what they see by moving puzzle pieces to form color and shape patterns.

The program consists of three types of puzzles, each having two levels of difficulty. The student manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the user to arrange shapes according to a given rule. The third puzzle requires the user to decide what rule is being applied.

"Gertrude's Puzzles" has been designated as a **SUPPLEMENTARY** learning resource in elementary mathematics.

GERTRUDE'S SECRETS

DESCRIPTION

Title: Gertrude's Secrets **Version:** 1982
Publisher: The Learning Company (Addison Wesley) **Cost:** $81.56 (1985)
Subject: Problem Solving **Users :** Ages 4-9
Components: 1 diskette and backup, teacher guide (57p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joystick optional
IBM PC family, 64K, color monitor, joystick optional
Alberta Education Call No.: BC 177 G384s 1982

ABSTRACT

This diskette is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to create order and to plan ahead by solving puzzles that involve arranging game pieces according to a given rule or by guessing a secret rule.

The program consists of three types of puzzles, each having two or three levels of difficulty. The child manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the student to arrange shapes according to given rules. The third puzzle requires the student to decide what rule is being applied (intersection of sets).

This report is based on the evaluation of the Apple product. However, in reviewing the IBM version, no notable differences were found.

The Apple and IBM versions of "Gertrude's Secrets" have been designated as **SUPPLEMENTARY** learning resources in elementary mathematics. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 5

DESCRIPTION

Title: Math Activities Courseware 5 (MAC 5)
Publisher: Houghton Mifflin Canada Ltd.
Subject: Mathematics
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Alberta Education Call No.: QA 107 H838 v5c 1983

Version: 1983
Cost: $225 (1985)
Users : Grade 5

ABSTRACT

MAC 5 contains 15 programs designed in a game mode to develop and strengthen problem solving strategies, provide experience in estimation and concept development and to reinforce basic math skills. Topics included are: rounding, estimation, whole number operations, fractions, decimals, area & perimeter, hours & minutes. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the \Houghton Mifflin Mathematics\ textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

"Math Activities Courseware 5" has been designated as a **RECOMMENDED** learning resource in Mathematics. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 6

DESCRIPTION

Title: Math Activities Courseware 6 (MAC 6)
Publisher: Houghton Mifflin Canada Ltd.
Subject: Mathematics
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable
Alberta Education Call No.: QA 107 H838 v6c 1983

Version: 1983
Cost: $225 (1985)
Users : Grade 6

ABSTRACT

MAC 6 contains 15 programs designed in a game mode to develop and strengthen problem solving strategies, provide experience in estimation and concept development and to reinforce basic math skills. Topics included are: logic, metrics, estimation, operations with whole numbers, decimals and fractions. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the \Houghton Mifflin Mathematics\ textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

"Math Activities Courseware 6" has been designated as a **RECOMMENDED** learning resource in Mathematics. For further information, see the full report in the Math section.

ROCKY'S BOOTS

DESCRIPTION

Title: Rocky's Boots **Version:** 1982
Publisher: The Learning Company (Addison Wesley) **Cost:** $99.95 (1985)
Subject: Problem Solving **Users :** Grades 3+
Components: 1 diskette and backup, teacher guide (44p.), 49 activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joystick optional
Alberta Education Call No.: QA 76.28 R656 1982

ABSTRACT

Learners will be able to logically analyze and build simple electronic circuits using components that are commonly found in digital computers.

The program, developed in game format, has six parts which the initial user is advised to play in order.

1. HOW TO MOVE: instruction in 4-directional cursor movement and in how to pick up and drop objects.
2. BUILDING MACHINES: introduction of use of wires, sensors & clackers to build a simple electrical circuit.
3. LOGIC GATES: illustration of the control of electrical current flow through AND, OR and NOT logic gates.
4. ROCKY'S BOOTS: the construction of a machine to conform to on-screen suggestions of expected output.
5. FLIP-FLOPS: the contruction of more complex electronic machines using flip-flops, clocks and delays.
6. ROCKY'S CHALLENGE: creation of a variety of electronic machines with differing complexity in Rocky Raccoon's fifteen challenge rooms.

Optional practice sessions are available in each section.

"Rocky's Boots" has been designated as a **SUPPLEMENTARY** learning resource for elementary science. For further information, see the full report in the Science section.

CODE QUEST

DESCRIPTION

Title: Code Quest
Publisher: Sunburst Communications
Subject: Problem Solving
Components: 1 disk & backup, teacher's guide (21p.)
System Requirements: Apple II+/IIe/IIc, 48K, disk drive, monochrome monitor

Version: 1983
Cost: $49.00 U.S.(1984)
Users : Grade 4 - 7

ABSTRACT

As a result of using this package, students will develop skills necessary to problem solving including sequencing, decoding, analyzing, pattern identification, classification and discrimination.

The student is presented with up to six successive clues to aid in the identification of a mystery object or person. The clues, written in code form, include ciphers written backwards, number and alphabetic substitution, substitution of code words for a letter, transposition of ciphers using a box grid, and substituting pictures for letters. The student must apply the problem solving skills of discrimination, pattern identification, analysis, classification, sequencing, flexibility and trial and error in an attempt to solve the problem.

"Code Quest" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 3

DESCRIPTION

Title: Math Activities Courseware 3 (MAC 3)
Publisher: Houghton Mifflin Canada Ltd.
Subject: Mathematics
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable

Version: 1983
Cost: $225.00 (1984)
Users : Grade 3

ABSTRACT

MAC 3's three disks contain 15 games designed to provide drill and practice in basic arithmetic operations. This courseware is designed to engage students in active experiences involving counting; addition, subtraction, multiplication and division skills; number pattern recognition; estimation; congruent figure recognition; and problem solving strategies.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User suport materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

"Math Activities Courseware 3" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 4

DESCRIPTION

Title: Math Activities Courseware 4 (MAC 4) **Version:** 1983
Publisher: Houghton Mifflin Canada Ltd. **Cost:** $225.00 (1984)
Subject: Mathematics **Users :** Grade 4
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable

ABSTRACT

MAC 4 contains 15 programs designed in a game mode to engage students in active experiences involving estimation, problem solving strategies, and concept development. Topics include: logic, problem solving, decimals, estimation, ordering, operations with whole numbers and making change. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the Houghton Mifflin Mathematics textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

"Math Activities Courseware 4" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 7

DESCRIPTION

Title: Math Activities Courseware 7 (MAC 7) **Version:** 1983
Publisher: Houghton Mifflin Canada Ltd. **Cost:** $250.00 (1984)
Subject: Mathematics **Users :** Grade 7
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (62p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable

ABSTRACT

This courseware is designed to engage students in active experiences involving estimation, problem solving strategies and concept development. MAC 7's three disks contain 18 games designed to provide drill and practice in estimation, decimals, problem solving, whole numbers, flow charts, order of operations and LOGO.

The programs are designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

"Mathematics Activities Courseware 7" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

MATH ACTIVITIES COURSEWARE 8

DESCRIPTION

Title: Math Activities Courseware 8 (MAC 8)
Publisher: Houghton Mifflin Canada Ltd.
Subject: Mathematics, Problem Solving
Components: 3 diskettes & backups, teacher's guide, worksheet & suggested activities (78p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor desirable

Version: 1983
Cost: $250.00 (1985)
Users : Grade 8

ABSTRACT

MAC 8's three disks contain 18 games designed to provide drill and practice in estimation, problem solving, logic, decimals, fractions, percents, square roots and geometry. This courseware is designed to supplement the Houghton Mifflin Mathematics textbook, and each activity is directly designed to reinforce a central concept of one of the textbook units. User support materials consisting of worksheets and activities are provided for each game.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

"Mathematics Activities Courseware 8" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the math section.

MOPTOWN HOTEL

DESCRIPTION

Title: Moptown Hotel
Publisher: The Learning Company (Addison Wesley)
Subject: Problem Solving
Components: 1 diskette and backup, teacher guide (49p.), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional

Version: 1983
Cost: $85.95 (1985)
Users : Ages 9+

ABSTRACT

This disk contains seven progresssively ordered games designed to develop logic skills. Each of the seven games requires the user to identify a moppet - a figure made by combining the attributes of tall or short, fat or thin, red or blue, bibbit or gibbit (body features). These games focus on recognizing analogies, completing closed sequences, identifying unique features, understanding negation, formulating & testing hypotheses and planning.

"Moptown Hotel" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

MOPTOWN PARADE

DESCRIPTION

Title: Moptown Parade **Version:** 1983
Publisher: The Learning Company (Addison Wesley) **Cost:** $85.95 (1985)
Subject: Problem solving **Users :** Ages 6-10
Components: 1 diskette and backup, teacher guide (49p), activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joy stick optional

ABSTRACT

Each of the seven games on this disk requires the student to identify a moppet--a figure made by combining the attributes of tall or short, fat or thin, red or blue, bibbit or gibbit (body features). Throught playing the games, the learner will identify similarities and differences in figures, recognize sequence patterns and apply them in next figure identification, identify the attribute(s) by which a cluster of figures is grouped and develop a language sequence of three adjectives followed by a noun.

"Moptown Parade" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Math section.

SPECTRUM: PATTERNS & PROGRAMS

DESCRIPTION

Title: Spectrum: Patterns and Programs **Version:** 1984
Publisher: Sunburst Communications **Cost:** $55.00 US (1984)
Subjects: Computer Literacy, Problem Solving **Users:** Grade 6+
Components: 1 disk with backup, teacher's guide (34p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor optional

ABSTRACT

This program covers topics of discovering patterns, programming logic and building skills in writing programs. The disk contains two programs.

PLAY A GAME - The user, playing at one of nine difficulty levels, attempts to determine a hidden pattern of bars of either colors or shapes with as few clues as possible. Once the user has discovered the pattern, (s)he attempts to match it either by listing the pattern bar by bar or by writing a pattern generating program.

CREATE A PATTERN - This program allows the user to write a hidden program or pattern either for practice or to challenge other players.

Each game can be played individually or in small groups.

"Spectrum: Patterns and Programs" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the Computer Literacy section.

THE FACTORY

DESCRIPTION

Version: 1983
Cost: $49.00 US (1984)
Tel. #: (914) 769-5030
Users: Grades 4 - 9

Title: The Factory
Publisher: Sunburst Communications
Source: 39 Washington Avenue, Pleasantville, NY 10570
Subject: Problem Solving
Components: 1 disk with back-up, teacher's guide (11p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor (preferred)

ABSTRACT

This disk is designed to provide students with experiences which will help them to develop visual discrimination and spatial perception skills, understand the importance of sequence and order, use the cognitive strategy of working backwards and understand that there may be more than one solution to a problem. Students are presented with three different machines that can rotate, punch holes and draw stripes on a square. There are three levels of difficulty:

1. Test a Machine - allows students to experiment with the three machines.
2. Build a Factory - allows students to design his/her own product using one to eight machines.
3. Make a Product - permits a student to examine a product and then work backwards to determine what process took place to construct the product.

"The Factory" is undergoing final evaluation and currently has no authorized status. For further information, see the full report in the math section.

THE KING'S RULE

DESCRIPTION

Version: 1984
Cost: $49.00 US (1984)
Users : Grade 4 +

Title: The King's Rule
Publisher: Sunburst Communications
Subject: Mathematics
Components: 1 disk & backup, teacher's guide (21p.)
System Requirements: Apple II+/IIe/IIc, 48K, disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

ABSTRACT

This program is designed to train students to form and test hypotheses, build skills in recognizing numerical patterns & relationships and develop skills in critical thinking & problem solving.

In playing the fantasy game, the student advances through a castle by successfully generating and testing hypotheses at six levels of difficulty. At each level students are shown three numbers which correspond to a secret mathematical rule. Students must generate a hypothesis about the rule and test it by entering their own sets of three numbers which hopefully will comply with the rule. When the student feels confident that (s)he knows the rule, (s)he can take a five-question quiz which will test his/her conclusions. The user must solve three consecutive number riddles at each level before being allowed to progress to the next level of difficulty.

"The King's Rule" is undergoing final evaluation and currently has no authorized status. For further information see the full report in the Math section.

PROBLEM SOLVING TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
ISLAND SOFTWARE	BLACK KAYLES	1982.0	42
ISLAND SOFTWARE	JIGSAW	1982.0	42
ISLAND SOFTWARE	JINX WELTER	1982.0	42
ISLAND SOFTWARE	RUBIK CANDLES	1982.0	42
ISLAND SOFTWARE	TRAFFIC JAM CHAIN REACTION	1982.0	42
MCE	REASONING - THE LOGICAL PROCESS	0.0	60
MCE	THE 4TH R - REASONING	0.0	60
SUNBURST COMMUNICATIONS	COLOR KEYS	1983.0	41
SUNBURST COMMUNICATIONS	FUN HOUSE MAZE	1984.0	41
SUNBURST COMMUNICATIONS	ODD ONE OUT	1983.0	42
SUNBURST COMMUNICATIONS	TEASERS BY TOBBS	1982.0	42

40-43: UNFAVORABLE EVALUATION RESULTS
50: PRODUCT HAS BEEN DISCONTINUED
60: UNABLE TO OBTAIN AN EVALUATION COPY
70: CONTENT IS OUTSIDE OF THE ALBERTA CURRICULUM

SCIENCE INDEX

AUTHORIZED

TITLE	PUBLISHER	GRADES	STATUS	PAGE
Basic Electricity	Programs for Learning	10 - 12	Supplementary	Sc 3
Basic Math Techniques	Merlan Scientific	7 - 12	Supplementary (Ma)	Ma 7
Compete	Conduit	10 +	Supplementary	Sc 5
Explorer Metros	Sunburst Communications	4 - 9	Supplementary (Ma)	Ma 21
Exponential Notation	Merlan Scientific	7 - 12	Supplementary (Ma)	Ma 23
Fundamental Skills for Chemistry	Programs for Learning	7 - 12	Supplementary	Sc 7
Haber	Conduit	10 - 12	Supplementary	Sc 9
Measurement	Merlan Scientific	7 - 12	Supplementary (Ma)	Ma 41
Microchem	Collier MacMillan Canada	10 - 12	Supplementary	Sc 11
Miscellaneous	Merlan Scientific	7 - 12	Supplementary (Ma)	Ma 43
Rocky's Boots	The Learning Company	3 +	Supplementary	Sc 13

UNDER THIRD STAGE REVIEW

TITLE	PUBLISHER	GRADES	STATUS	PAGE
Basic Concepts	Merlan Scientific	10 - 12	Still Under Review	Sc 15
Cellular Reproduction	Merlan Scientific	10 - 12	Still Under Review	Sc 17
Electrical Energy	Merlan Scientific	10 - 12	Still Under Review	Sc 19
General Chemistry	John Wiley & Sons	10 +	Still Under Review	Sc 21
Hydrogen Spectrum	Heinemann Computers in Education	10 - 12	Still Under Review	Sc 23
Ideal Gases	COMPress	10 +	Still Under Review	Sc 25
Introduction To Circuits	Merlan Scientific	10 - 12	Still Under Review	Sc 27
Laws of Motion	Educational Materials & Equipment	10 +	Still Under Review	Sc 29
Lenses	Heinemann Computers in Education	9 - 12	Still Under Review	Sc 31
Longitudinal Wave Demonstrations	Merlan Scientific	10 - 12	Still Under Review	Sc 33
Oil Drop	Edutech	10 - 12	Still Under Review	Sc 35

UNDER THIRD STAGE REVIEW - continued

Periodic Motion	Merlan Scientific	10 - 12	Still Under Review	Sc 37
Periodic Waves: Basic Concepts	Merlan Scientific	10 - 12	Still Under Review	Sc 39
Ray Tracer	Vernier Software	10 - 12	Still Under Review	Sc 41
Resistance	Merlan Scientific	10 - 12	Still Under Review	Sc 43
Transverse Waves	Heinemann Computers in Education	9 - 12	Still Under Review	Sc 45
Water Pollution	Educational Materials & Equipment	7 +	Still Under Review	Sc 47
Wave Addition II	Vernier Software	10 - 12	Still Under Review	Sc 49
Wave Demonstrations	Merlan Scientific	10 - 12	Still Under Review	Sc 51
Waves in a Linear Medium: Introduction	Merlan Scientific	10 - 12	Still Under Review	Sc 53
Waves in a Linear Medium: Superposition	Merlan Scientific	10 - 12	Still Under Review	Sc 55
Writing Chemical Formulas	Microcomputer Workshops	7 - 12	Still Under Review	Sc 57

LIST OF TITLES WE ARE UNABLE TO RECOMMEND Sc 59

BASIC ELECTRICITY

DESCRIPTION

Title: Basic Electricity
Author: Paul Cauchon
Publisher: Programs for Learning
Source: P.O. Box 954, New Milford, CT 06776
Subjects: Science; industrial arts
Topics: Series and parallel circuit analysis
Components: 1 disk, manual (6p.) (backup copies may be made)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only.
Alberta Education Call No.: QC 523 C371 1983

Version: 1983
Display Language: English
Cost: $50 U.S. (1984)
Tel. #: (203) 355-3452
Users : High School

OBJECTIVES

The three programs in this series are all designed to give practise in applying Ohm's and Kirchoff's laws to simple D.C. circuits.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains three programs:

SERIES - This program begins with a simple circuit containing only a single resistance and then proceeds to one with three resistances. In addition to asking for the reading on either an ammeter or voltmeter, the student is asked to predict the effect if one of the meters is bypassed, or "shorted out".

PARALLEL - This program presents three resistances in parallel and poses questions concerning the current flow at various points in the circuit.

NETWORK - This program depicts a combination series/parallel circuit network and asks the student for voltmeter readings. To answer the problem, the student must simplify the network, branch by branch, ultimately reducing it to a simple series circuit with one resistance, equivalent to the effect of the original six.

The accompanying six page manual has reproducible student instruction pages which provide explanations and sample circuit diagrams for each program.

PEDAGOGICAL CONTENT EVALUATION

The range of content is appropriate and effective for high school use. Progression from simple to complex questions (Ohm's Law to Kirchoff's Law to a combination of these) results in excellent sequencing provided the programs are completed in succession. Content depth varies since remediation provides instruction and sometimes restarts a practice sequence with different numbers.

The program is accurate in its calculations of correct answers, but the disk does not specify the degree of precision required in rounding answers. Trial and error indicates that accuracy to within 2% is required; however, the user may become frustrated with a "correct" answer being evaluated as wrong simply because (s/he did not carry it to sufficient decimal places. For example, an answer of 1.3 was rejected in favor of 1.33.

INSTRUCTIONAL FORMAT DESCRIPTION

After entering his/her name, the student controls rate by entering either a numerical or letter answer to each question. Questions appear to be randomly generated from a limited set within the first two programs. In "Network", if the student is unable to answer a question, subsequent questions are posed in a carefully selected sequence which leads the student into analyzing the diagram and thus obtaining the correct answer to the original question. Feedback is immediate and consists of a comment such as "Right" or "Very Good" for a correct answer or, for an incorrect answer, a brief explanation of how to obtain the correct answer. Incorrect responses produce another question of the same type. The length of each program is dependent upon the number of correct student responses--"Series" ends with 8 correct responses, "Parallel" with 12, and "Network" with 2. Both the "Series" and the "Parallel" programs provide a percentage evaluation at the end of the program together with a message suggesting further practice if the score obtained was less than 85%

INSTRUCTIONAL FORMAT EVALUATION

The technique of only providing instruction in remedial sequences is appropriate to a high school class that has been given prior instruction in electrical circuitry. Both question randomization and progression are generally effective given the confines of a limited question bank. For example, in both "Series" and "Parallel" it is possible to obtain the same or nearly the same sequence in subsequent runnings. It was also noted that in those questions asking whether the current would go up, down, or stay the same if a particular variable was changed, the correct response was always up.

Feedback is appropriate to the target audience but tends to have little variation and so becomes boring with repeated use.

Remedial assistance provided throughout the programs is generally very effective, although occasionally the student encounters a message such as "The answer is 8--Study that!" with no explanation of how this answer was obtained.

TECHNICAL CHARACTERISTICS DESCRIPTION

All programs are displayed in black and white with high resolution graphics used to depict circuit diagrams. Text is generated in standard size, upper case only.

TECHNICAL CHARACTERISTICS EVALUATION

Graphics are effective and uncluttered; however, the fact that each time even a single meter is moved all values are wiped out and reprinted may cause some confusion. Frequent disk interaction results in slow program movement--this is particularly evident in "Network". Scrolling is inappropriate in that it removes an incorrect response, thus a student cannot compare the correct answer with his/her input to determine whether the error was due to typing inaccuracy, a rounding error or a miscalculation.

Text displays are mediocre both because they are limited to upper case only and because numbers and units tend to be crowded together, thus adversely affecting readability. (e.g. "anypoint", "12volts/10ohms", "1.2amps").

SUMMATION

This disk provides a good drill on basic resistor circuits. Content is well-sequenced with effective progression from simple to difficult problems. All programs have excellent instructional design and make good use of the computer's abilities to provide effective remediation. Technical design could be improved to heighten student interest and motivation.

STATUS

"Basic Electricity" has been designated as a **SUPPLEMENTARY** resource.

PURCHASE INFORMATION

This product may be purchased for $50.00 U.S. (March, 1984) from Programs For Learning at the address given at the beginning of the report. It should be noted that the disk is not copy protected and the company permits unlimited copies to be made for use within the school making the purchase.

Defective diskettes will be replaced by the company without charge within a one year warranty period. Disks which become inoperable through normal wear and tear will be replaced for a $5.00 handling charge. As unlimited copies can be made, this should not be required.

In Alberta, the disk may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

COMPETE

DESCRIPTION

Title: Compete
Authors: M. E. Leveridge
Publisher: Conduit
Source: University of Iowa, Oakdale Campus, Iowa City, Iowa, 52242
Subject: Science
Topics: Interactions between flowering plants
Components: 1 diskette, teacher's guide (11p.), student's notes (15p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor.
Other Formats Available (not evaluated): TRS-80 Model I/III, PET
Alberta Education Call No.: QK 911 C737 1980

Version: 1982
Display Language: English
Cost: $45 U.S. (1984)
Tel. #: (319) 353-5789
Users : High school +

OBJECTIVES

The learner will formulate conclusions from the computer simulated conditions by investigating the effects of overcrowding, interaction of plants in a monoculture, interaction of plants in a plant mixture and time versus amount of plant growth.

PEDAGOGICAL CONTENT DESCRIPTION

This program is a simulation of plant growth and yields under two possible conditions - monoculture or mixture. The plants studied are barley, oats, dwarf peas and tall peas. The row spacing may be modified to discover relationships between plant growth vs. row spacing, comparative plant growth in two competing species with the same row spacing, and comparative plant growth in two competing species with different row spacing. All data are displayed in metric form (e.g. grams/square meter).

PEDAGOGICAL CONTENT EVALUATION

The computer program itself is simply a data generator and is intended to complement lab experiments. It quickly generates clear and easily interpreted data for student manipulation. The teacher's and student's guides are very usable and well organized.

The content, however, is not completely appropriate for high school students. The accompanying student's guide is written at a reading level which would tax the average high school student. Also, the only place in the existing Alberta curriculum where this might be usable is in an ecology unit or possibly in an agriculture course with advanced students.

While data are displayed in metric form, this is not always SI metric.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of making decisions as to which plant type is to be grown, what the row spacing should be and whether the plants are to grow on their own or in mixtures. The only feedback (other than the information being provided) is for an incorrect response to be corrected (e.g. if the student types in Y instead of the required YES).

INSTRUCTIONAL FORMAT EVALUATION

This simulation provides easily interpreted data. However, for the average student to make constructive use of this program, the teacher would be required to set up the conditions to be studied (e.g. compare plant A and B at the same row spacing and then do...). The student guide directs the student in this way, but it would be above the level of the average high school student to follow the instructions independently.

Once the data are graphed and the student proceeds, there is no way of recalling the information. The program does not ask interpretation or comprehension questions. Thought provoking questions are addressed in the support materials but their high reading level does not make them appropriate for average students.

Student predictions are not entered into the computer or recorded on the diskette but rather are entered into the workbook; therefore, evaluation of the student's responses is possible only if the teacher marks the workbook.

TECHNICAL CHARACTERISTICS DESCRIPTION

Color high-resolution graphs are used in the plotting of information. Text, although generated in high-res graphics, is not larger than normal lettering. Sound is not used.

TECHNICAL CHARACTERISTICS EVALUATION

The use of high resolution graphics for plotting data is appropriate and the use of shape tables allows for clear labelling of the lines of the graph (e.g. barley) as well as the axes.

The technical design could be improved if there was provision for reviewing a graph or if results were available in print copy to enable further study of the graph.

SUMMATION

This diskette is a data generator only. Together with the support materials and with teacher intervention, it does provide enough latitude to allow for diverse teaching approaches to accommodate various levels of students. Its strength could be improved by including more of the information in the support materials on the diskette itself or by making printouts of the graphs available.

STATUS

"Compete" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This package may be purchased for $45.00 U.S. (1984) from Conduit at the address given at the beginning of the report.

Defective diskettes will be replaced without charge within a 30 day warranty period. After that period, damaged diskettes may be replaced for $10.00.

The diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchasing agreement.

FUNDAMENTAL SKILLS FOR CHEMISTRY

DESCRIPTION

Title: Fundamental Skills for Chemistry
Authors: None cited
Publisher: Programs for Learning Inc.
Source: P.O. Box 954, New Milford, CT 06776
Subject: Science

Version: 1983
Display Language: English
Cost: $150.00 U.S. (1984)
Tel. #: (203) 355-3452
Users : Junior/Senior High

Topics: Metric, chemical symbols, properties, equations, sig. digits, ion formulas and charges, sci. notation, + more.
Components: 1 diskette (not copy protected), manual (31p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): PET, TRS-80
Alberta Education Call No.: QD 42 F981 1983

OBJECTIVES

The student will be able to:

1. Balance chemical equations by inspection.
2. Solve problems involving mass, volume, and density.
3. Calculate formula weights (molar mass).
4. Convert temperature involving the Celsius, Fahrenheit and Kelvin scales.
5. Convert between Imperial and Metric units of length, mass, and volume.
6. Write numbers in exponential notation and state the number of significant digits in a number.
7. State the names and symbols for the first 20 elements.
8. Write out the electron configurations given the atomic number.
9. State the symbols and names for 37 commonly used ions.
10. Solve questions involving scientific notation.

PEDAGOGICAL CONTENT DESCRIPTION

BALEQ randomly selects an unbalanced equation from a set of twenty and then requests the student to enter the coefficient of one of the reactants or products.

CONVERT presents thirty different types of questions which require conversion between imperial and metric units of length, mass and volume.

DENSITY provides drill and practice on calculations involving mass, volume and density.

ELEMENT provides drill and practice on the names and symbols for the first twenty elements, the meaning of the atomic number, and, if desired, the electron configurations for these twenty elements.

EXPO gives a tutorial explaining scientific notation and the steps involved in writing a number in this form is followed by a series of practice questions on writing a number in exponential form and converting it back to normal form again.

IONS asks students for the formula and charge of one of forty randomly selected common ions.

METRIC provides drill and practice in converting between the prefixes milli-, centi-, or kilo-.

MOLWT requires that the student obtains atomic weights from a periodic table and uses them to calculate the formula weight (molar mass) of a compound chosen randomly from a data bank of 20 metals and 12 non-metals or complex ions.

NOMEN randomly chooses 1 of 17 possible positive ions and 1 of 12 negative ions and asks the student for the name and formula of the resulting compound.

SIGHELP randomly selects a number and asks for the number of significant digits in it. Incorrect responses receive corrective feedback.

SYMBOL randomly selects 5 elements from a possible 37 element data bank and asks for the correct name or symbol.

TEMP presents the three conversion formulas used to convert among the Celsius, Fahrenheit, and Kelvin scales and then poses questions for student practice.

SCINOT presents a brief explanation of scientific notation and the operations of addition, subtraction, multiplication and division. Drill questions are then made available at one of four difficulty levels.

The user's manual presents brief program desciptions to aid in selection.

PEDAGOGICAL CONTENT EVALUATION

The range of material covered in these programs is appropriate for grade 9 and 10 chemistry students. Programs are designed as an adjunct and review of regular laboratory and classroom work; they do not contain sufficient depth to act as stand alone units. Programs can be accessed in any order from the menu, thus allowing good flexibility. The content is accurate and is presented in a clear and concise manner; however, the amount of instruction provided is limited. There is generally no sequencing within programs nor is there a designed sequence from one program to the next. These are distinct, simple drill and practice programs designed to be used as supplements in an introductory chemistry course.

INSTRUCTIONAL FORMAT DESCRIPTION

After program selection from the main menu, student interaction consists of input of answers, use of the left arrow key for correction or use of RETURN for page turning. Questions are randomly selected from a limited data bank, and short written feedback messages are given after each response. Most programs give students two attempts at an answer and then present a clue. If the third answer attempt is also incorrect, the correct answer is presented along with a short explanation. Quantitative feedback is given at the end of each set of questions either as a percentage or as the total number correct. Students generally have control over rate and amount.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction, feedback and instructional technique are generally effective for providing reinforcement and review of previously studied topics. Questions are effectively randomized, and negative feedback generally includes a corrective element. As this is limited and as the programs lack remedial branches, they would not be suitable for students having major difficulties with the concepts.

TECHNICAL CHARACTERISTICS DESCRIPTION

Some programs are written in standard size upper/lower case text while others utilize upper case letters only. Sub/superscripts are generally used.

TECHNICAL CHARACTERISTICS EVALUATION

Regular text displays are well-spaced and clear, although they lack variety. Use of upper and lower case text in all programs would have been advantageous. Programs generally are easy to use and allow a great degree of user control. Students can use the left arrow key to correct entries--unfortunately this fact is pointed out only in the documentation and not on the diskette itself. The left arrow key does not work on program #1. The lack of graphics and the minimal use of color do not hamper the effectiveness of the programs.

SUMMATION

The concise programs contained in this package, although limited in explanation and motivation, could be useful in the classroom for providing review and some remediation.

STATUS

"Fundamental Skills for Chemistry" has been designated as a **SUPPLEMENTARY** resource.

PURCHASE INFORMATION

This product may be purchased for $150.00 U.S. (May, 1984) from Programs for Learning Inc. at the address given at the beginning of the report. It should be noted that the diskette is not copy protected and the company permits unlimited copies to be made for use within the school making the purchase.

Defective diskettes will be replaced by the company without charge within a one year warranty period. Diskettes which become inoperable through normal wear and tear will be replaced for a $5.00 handling charge. As unlimited copies can be made, this should not be required.

In Alberta, the diskette may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

HABER

DESCRIPTION

Title: Haber
Authors: R. Edens & K. Shaw
Publisher: Conduit
Source: University of Iowa, Oakdale Campus, Iowa City, Iowa, 52242
Subject: Science
Topics: Haber process, equilibrium, reaction kinetics
Components: 1 diskette, teacher's guide (16p.), student's guide (12p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): TRS-80, PET 2000 and 4000
Alberta Education Call No.: QD 33 H114 1983

Version: 1983
Display Language: English
Cost: $45 U.S (1984)
Tel. #: (319) 353-5789
Users : High School

OBJECTIVES

To give a further understanding of:

1. the Haber process
2. the effects on the equilibrium yield of ammonia of changing temperature, pressure and the initial hydrogen to nitrogen molar ratio
3. the effects on the reaction rate of changing temperature and pressure
4. the effects on the reaction rate of using various catalysts
5. some of the considerations which have to be taken into account in the design of a chemical plant for the industrial production of ammonia
6. the interpretation of results predicted by a model for which the students are unable to create in the laboratory
7. the use of a mathematical model.

PEDAGOGICAL CONTENT DESCRIPTION

This computer simulation uses a mathematical model of the Haber process to depict two laboratory investigations:

HABER 1 allows the user to investigate the effect of varying temperature, pressure and molar ratio of hydrogen to nitrogen on the percentage yield of ammonia. The results may be graphically displayed to emphasize the trends.

HABER 2 allows the user to investigate the effect of varying temperature, pressure and the catalyst on the rates of both forward and reverse reactions, i.e. on the rate of attaining equilibrium. The ammonia production may be plotted against time for each parameter chosen.

In both investigations the parameters that are held constant are shown below the graph. A student guidebook provides background information essential to program operation, notes on the investigative process, and specific questions addressing the concepts introduced in each investigation.

PEDAGOGICAL CONTENT EVALUATION

This program combines clear and concise content with good sequencing as it moves from an investigation dealing with percentage yield of ammonia to an investigation dealing with rate of reaction. Depth and range may be most appropriate for advanced learners both because prior knowledge of the subject area is assumed and because equilibrium and kinetics are elective rather than core topic areas in Chemistry 30. User support materials are well-designed and provide good background information as well as appropriate questions pertaining to the mathematical model.

INSTRUCTIONAL FORMAT DESCRIPTION

This simulation is not a stand alone teaching unit but rather should be viewed as an opportunity for the student to apply classroom learnings to a series of investigations in a simulated environment and then draw conclusions from the output. The user has total control over sequence. After choosing which investigation to run, students select the variable they wish altered (molar ratio H:N, temperature, or pressure in Investigation I) or the type of catalyst they wish to work with (Investigation 2). Disk questions prompt the student to give values to all the parameters including the increment step for the parameters that are changed. (Additional investigational questions related to the data obtained in the program are provided in the student notes.) If the parameters are within the limits of the model, a set of data is produced (which can be optionally graphed) showing the percentage yield of ammonia. Parameters outside the model limits prompt the user for a new entry.

INSTRUCTIONAL FORMAT EVALUATION

The use of a simulation is appropriate to the content. The user has appropriate control over which type of investigation to pursue, which factors should be variable and which should be constant, and what parameters (s)he wishes to work within. The use of a graph to illustrate the data obtained is good, especially since three sets of data can be plotted on the same grid for comparison. Advanced students will benefit from this program since it clearly shows "What will happen if....", however weaker students may have to be coached to fully appreciate the chemical reactions they have seen.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is presented in standard size, upper and lower case letters. Graphics are used to display a data table and to depict the line graphs.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are well-formatted and clear. Each graph is limited to a maximum of three lines per investigation. While screen displays can be somewhat crowded, this should not be a problem for this target audience. Technical design is good.

SUMMATION

Good documentation, reasonable price, effective student control and clear graphical displays combine to provide a generally effective simulation which time limits and safety factors would otherwise preclude from first-hand laboratory study. It should be noted that this diskette allows the student to generate data from which learning may take place - there is no direct instruction provided on the diskette itself.

STATUS

"Haber" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $45.00 U.S. (1984) from Conduit at the address shown at the beginning of the report.

Defective diskettes will be replaced without charge within a 30 day warranty period. After that period, damaged diskettes may be replaced for a charge of $10.00.

This diskette has the advantage of being capable of operation with more than one machine at a time if only one of the two programs is accessed at a time; however, such use is subject to copyright laws and any license/purchase agreement.

MICROCHEM

DESCRIPTION

Title: Microchem
Author: Robert J. Ouellette
Publisher: Collier Macmillan Canada Inc.
Source: 539 Collier Macmillan Drive, Cambridge, Ont., N1R 5W9
Subject: Science
Topics: Chemistry problems
Components: 3 diskettes, user's guide (4p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): PET, TRS-80
Alberta Education Call No.: QD 39.3 C6 M626 1983

Version: 1983
Display Language: English
Cost: $350 (1984)
Tel. #: (416) 449-6030
Users : High School

OBJECTIVES

"Microchem" is designed to provide a variety of exercises to enhance a student's problem-solving abilities related to basic chemical terminology, procedures, concepts and calculations.

PEDAGOGICAL CONTENT DESCRIPTION

Fifty programs are included in the three diskettes:

1. Significant Figures
2. Scientific Notation
3. Metric Conversion
4. Unit Conversions
5. Density Calculations
6. Temperature Conversions
7. Elemental Symbols
8. Atomic Particles
9. Complex Ions
10. Mole Concepts
11. Percent Composition
12. Determining an Empirical Formula
13. Composition and Empirical Formula
14. Combustion Analysis
15. Balancing Equations
16. Formula Weights and Stoichiometry
17. Equations and Stoichiometry
18. Gas Laws
19. Combined Gas Law
20. Ideal Gas Law
21. Partial Pressure
22. Graham's Law
23. Thermochemistry
24. Bohr Atom
25. Quantum Numbers
26. Electron Configuration
27. Periodic Trends
28. Oxidation Numbers
29. Concentration of Solutions
30. Raoult's Law
31. Boiling and Freezing Points
32. Osmotic Pressure
33. Kinetics
34. Equilibrium Concepts
35. Equilibrium Calculations
36. Thermodynamics
37. Solubility Product Constant
38. Common Ion Effect
39. Molarity of Acids and Bases
40. Ionization of Water
41. pH
42. Ionization of Weak Acids
43. Hydrolysis of Salts
44. Buffers
45. Balancing Redox Equations
46. Electromotive Series
47. Voltaic Cells
48. Nearnst Equation
49. Faraday's Law
50. Nuclear Chemistry

These programs are not stand-alone teaching programs but rather are drill and practice routines designed to support previous classroom instruction. Each program can be used independently and most programs begin with a brief statement of rules, definitions, and/or formulae, then pose a series of drill questions (usually progressively sequenced), and conclude with a summary of performance.

PEDAGOGICAL CONTENT EVALUATION

The user selects the sequence from the menu. Once in a program, depth of coverage is usually dependent upon the accuracy of a student's response. Range is generally appropriate with at least three quarters of the programs directly correlating with the Alberta high school chemistry curriculum as either core or supplemental topic areas.

Some content difficulties may be encountered due to:

1. Inaccuracies and inconsistencies in the application of SI Metric rules
2. A general lack of examples to clarify expected procedure
3. References to atomic and formula weight instead of molar mass
4. The use of a variety of pressure measurement schemes
5. Significant digit calculation inconsistencies. For example, calculation of significant digits is performed after each step in the calculation rather than once for the overall problem, the convention of distinguishing between "350" and "350." is not maintained throughout the program.

INSTRUCTIONAL FORMAT DESCRIPTION

Students chose a program from the main menu and occasionally make a further choice within a sub-menu. In some programs the student may elect to see a review. Drills may be repeated or exited at any time; however, quantitative feedback is provided only at the conclusion of a program. The major student interaction is page turning and answer input (for which separate paper and pencil calculations are required--a calculator is recommended). Correct answers receive a brief, varied, congratulatory message and incorrect responses produce an unqualified statement giving the answer and a detailed explanation of the procedure used to obtain the correct answer.

Questions appear to be randomly generated from a limited bank. Lengthy problems are often broken down into sub-sections to lead the user to the correct answer. All programs have a minimum number of questions; however, more may be automatically added by the program in relation to the skill level demonstrated by the student or the user can choose to do additional questions.

INSTRUCTIONAL FORMAT EVALUATION

Each program provides frequent, effective student interaction. Questions are posed in a logical order and are followed by immediate, corrective, encouraging feedback which compensates for the superficial introductions to the drills. The fact that questions which are answered incorrectly are followed by another similiar type of question is a pedagogical strength of the package.

Some confusion may exist with regard to the format of answer entry in that either alphabetical or numerical inputs are allowed but not both. For example "-1" is called for as the answer to the charge of a cyanide ion whereas "CN-1" will be marked as incorrect.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is depicted in combined upper/lower case using a high resolution character generator. Scrolling is frequently used to present more than one question on the same formula or principle; however, answers always remain on the screen when evaluated. Programs 46-48 use graphics to show displacement reactions and to depict voltaic cell operation. The programs do not use color or sound.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are clear and text is well-formatted with chemical and mathematical formulae shown in true sub/superscript form. All programs conform to a uniform method of presentation which makes them easy to use. Programs are generally bomb proof; however, they occasionally will accept string inputs where only numerical or alphabetical entries are valid. Technical design could be improved by numbering all problems as they appear on the screen.

SUMMATION

This package presents straight-forward drill on a variety of chemistry topics which closely parallel the Alberta high school curriculum. The sound instructional design combined with the effective feedback provided compensates for other weaknesses noted in the programs.

STATUS

"Microchem" has been designated as a **SUPPLEMENTARY** learning resource.

PURCHASE INFORMATION

This product may be purchased for $350.00 (April, 1984) from Collier Macmillan at the address given at the beginning of the report. Discounts are available for the purchase of more than one set.

Defective diskettes will be replaced without charge within a 90 day warranty period. Replacement diskettes will be provided for $20.95 (April, 1984) subject to the return of diskettes made inoperable due to normal wear and tear.

These diskettes have the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

ROCKY'S BOOTS

DESCRIPTION

Title: Rocky's Boots
Authors: Warren Robinett, Leslie Grimm,
Publisher: The Learning Company
Source: c/o Addison Wesley, P.O. Box 580, 26 Prince Andrew Place, Don Mills, ON M3C 2T8
Subject: Problem Solving
Topics: Reasoning skills, electronic circuitry
Components: 1 diskette and backup, teacher guide (44p.), 49 activity sheets (black line masters)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, color monitor, joystick optional
Other Formats Available (not evaluated): Atari, IBM, Commodore 64
Alberta Education Call No.: QA 76.28 R656 1982

Version: 1982
Display Language: English
Cost: $99.95 (1985)
Tel. #: (416) 447-5101
Users : Grades 3+

OBJECTIVES

Learners will be able to logically analyze and build simple electronic circuits using components that are commonly found in digital computers.

PEDAGOGICAL CONTENT DESCRIPTION

This program, developed in game format, has six parts which the initial user is advised to play in order.

1. HOW TO MOVE: instruction in 4-directional cursor movement and in how to pick up and drop objects.
2. BUILDING MACHINES: introduction of use of wires, sensors & clackers to build a simple electrical circuit.
3. LOGIC GATES: illustration of the control of electrical current flow through AND, OR and NOT logic gates.
4. ROCKY'S BOOTS: the construction of a machine to conform to on-screen suggestions of expected output.
5. FLIP-FLOPS: the contruction of more complex electronic machines using flip-flops, clocks and delays.
6. ROCKY'S CHALLENGE: creation of a variety of electronic machines with differing complexity in Rocky Raccoon's fifteen challenge rooms.

Optional practice sessions are available in each section.

PEDAGOGICAL CONTENT EVALUATION

The range of material may be too challenging for the younger students in the target audience. The level of abstraction required to play "Rocky's Challenge" is very sophisticated and younger/less able students may not progress beyond the "Building Machines" stage without active intervention by the teacher. The documentation requires a reading level of at least a ten year old and some terminology (e.g. oscillator, throbulator) demands advanced maturity.

Sequencing is orderly, logical and has smooth transitional flow. New terms are defined, their functions are illustrated and practice is given in employing the new skill at each level.

Since optional practice sessions occur after each section, adequate depth of material presentation is available.

The content is accurate except that circuits must begin and end at the same source which is somewhat misleading.

Although the documentation suggests that the purpose of the program is to "learn what makes computers tick", at no point on the diskette is the electronic logic flow ever specified as being integral to computer operation. Furthermore, this content does not fit well into the Alberta elementary curriculum; however, it may be used for science enrichment and/or for teaching logic and problem solving.

INSTRUCTIONAL FORMAT DESCRIPTION

Students interact with the program by selecting tutorials, lessons and degrees of playing difficulty and then construct, move or dismantle machines using I, J, K, M, CTRL and REPT keys.

Feedback in the initial sections is provided by 'seeing' the electrical flow pass through the circuit if it has been properly constructed. Everchanging scores also reflect progress and a perfect score is rewarded by Rocky (an animated raccoon) dancing an Irish jig.

Students can control their path through the programs by selecting the sections, choosing to do additional practice, reviewing a previous explanation and choosing different complexities of machine construction challenges.

INSTRUCTIONAL FORMAT EVALUATION

There is a high degree of student interaction, however a long attention span is required. Progress is slow and instruction may be laborious for the elementary student. An entire way of thinking is being instructed and many repeated sessions will be necessary for the user to effectively understand the concept. For this reason the provision of extra practice is a program strength.

The feedback is somewhat inappropriate because a machine either conducts current or it doesn't. Thus a score of less than 24 (indicating partial correctness) is misleading. The raccoon dance is interesting initially but soon becomes repetitive and boring.

There is good student control of the program which allows exit of any section at any time or branching as desired. The choices available to the student are a program plus.

TECHNICAL CHARACTERISTICS DESCRIPTION

A color monitor is required to use the program. Sound, which can be disabled, is used for the clacker machine, to enhance the electrical boot kicking procedure and to provide a song for Rocky's dance.

Upper and lower case high resolution text is generated in standard sizes.

TECHNICAL CHARACTERISTICS EVALUATION

The technical design is excellent. Screen displays are well formatted, character generation is clear and transition is smooth and user controlled. The sound is effective and the disable feature is useful.

Program loading of various branches is somewhat slow.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

The original product, as distributed by The Learning Company, contains a user's manual of 5 small pages. No teacher support materials are available.

The educational version, distributed by Addison Wesley, has an extensive teacher's guide. This includes general notes on teaching with computers, an extensive description of the program and many suggested on-line and off-line activities in black-line master form. Note that the educational version also includes a back-up diskette.

IMPLEMENTATIONAL SUPPORT EVALUATION

The product as distributed by the Learning Company is intended to home use and, as such, little support is provided. The Addison Wesley package, while more expensive, includes extensive support. The suggested activities in particular are valuable additions to the package as they provide the teacher with implementational strategies for incorporating the program into classroom activities. Black line masters for these on-line and off-line activities are valuable resources.

SUMMATION

The technical design, through the use of color, sound and animation, makes the program more appropriate for elementary students but the content seems more appropriate for upper junior high aged students as mature reading ability and attention span are required. The lack of fit to the elementary curriculum is probably this program's only significant weakness.

The program presents an interesting approach to teaching logic. The motivation provided by the technical design is excellent.

STATUS

"Rocky's Boots" has been designated as a **SUPPLEMENTARY** learning resource for elementary science.

PURCHASE INFORMATION

This product may be purchased for $44.95 U.S. (Oct. 1984) from The Learning Company at 545 Middlefield Road, Suite 170, Menlo Park, California, 94025. The educational product including two disks and the teacher documentation is available for $99.95 (Canadian) (1985) from Addison Wesley at the address given at the beginning of the report. Both companies provide the same warranties, i.e. defective diskettes will be replaced without charge within a 90 day warranty period. Disks which are damaged by the user will be replaced for $10.00 U.S. upon return of the damaged diskette. This includes diskettes which wear out through normal wear and tear. There is no time limit for this warranty.

In Alberta, the home product may be purchased from Alphatel Computer Products, Edupro Software and Roxcel, (see page v. of the preface). Contact the companies directly for price and warranty information.

This diskette has the advantage of being capable of operation with more than one machine at a time; however, such use is subject to copyright laws and any license or purchase agreement.

BASIC CONCEPTS

DESCRIPTION

Title: Basic Concepts
Series: Basic Concepts of Electricity Series (#1)
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 247 Armstrong Avenue, Georgetown, Ontario L7G 4X6
Subjects: Science
Topics: Electric charge, electric currents, electric potential difference
Components: 2 Disks & backups, teacher's guide (17p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore PET/64

Version: 1983
Display Language: English
Cost: $95.00 (1985)
Tel. #: (416) 877-0171
Users: Grades 10 - 12

OBJECTIVES

The instructional objectives for the three programs contained on this disk are:

A. ELECTRIC CHARGE -
  1. To state the law of electric charges.
  2. To state the kind of charge on electrons, protons, and neutrons and their respective locations inside atoms.
  3. To describe the difference between a positive ion and a neutral atom.
  4. To explain a positive and negative charge as a loss or gain of electrons.
  5. To state the difference between a coulomb and an elementary charge.

B. CURRENT -
  1. To distinguish between thermal agitation and current.
  2. To calculate the current in a circuit given the charge passing a point in an electric circuit in a period of time.
  3. Given two of current, charge, and time, to calculate the third.

C. ELECTRIC POTENTIAL DIFFERENCE -
  1. To show where charge gains and loses in electric energy occur as it moves through a simple electric circuit.
  2. Given the amount of charge that passes through a circuit and the change in its electric potential difference between the two points, to calculate the potential difference between the two points.
  3. Given the charges passing between two points, the change in its electrical potential energy, and the potential difference between the two points, to calculate the third.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains three programs on the basic concepts of electricity:

ELECTRIC CHARGE - This program presents a simulation of electrostatics, reviews the three basic parts of the atom (electron, proton, and neutron), explains the difference between ions and atoms, discusses positive and negative charges, and explains the difference between a coulomb and an elementary charge. Students interact via multiple choice and sentence completion questions.

ELECTRIC CURRENT - This program discusses the differences between thermal agitation and current, illustrates electric current via a simulation experiment and investigates the mathematical relationships between current, charge and time.

ELECTRIC POTENTIAL DIFFERENCE - This program illustrates the change in electric current as a current passes through a load. Potential differences across the load are investigated and the mathematical relationship between electric potential energy, charge, and potential difference is explored.

Programs two and three each include an optional drill consisting of ten problem exercises related to the program. A separate test disk contains 15 multiple choice questions based upon the three lessons. Scores, diagnostic information and an optional printout are provided.

PEDAGOGICAL CONTENT EVALUATION

The presentation and development of each concept is logical and well ordered. Animation is used effectively to illustrate textual descriptions and clarify abstract concepts. Range, content and depth are appropriate to the target audience. SI Metric format is used throughout.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, entering single letter answers, or entering short words/phrases to complete a sentence. Questions within each lesson are presented in a fixed order, however review questions to test student understanding are randomized from a limited test bank. Correct answers receive positive textual feedback such as "Great Work" and close answers (e.g. entering a synonym for a word) receive a cautionary message such as "Hold on now". Feedback to incorrect answers informs the student the answer is wrong and the program usually allows a second attempt before presenting the correct answer. If a number of questions are answered incorrectly the program may go over the material again. Quantitative feedback is provided continually throughout the drills and encourages the student to get a perfect score.

The text diskette gives the user a choice of quantitative feedback after each question or at the end of the test. The user is also given the opportunity of reviewing the questions and is provided with an explanation of the concept that pertains to the questions answered in error. If a printer is available, a hardcopy printout of the student's score and a diagnosis of areas of weakness can be made.

Sequence and rate are user controlled; amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The method of moving from the concrete to the abstract via example is instructionally sound. The program allows ample student interaction and the error checking routines for close but incorrect responses is very good. Since the program expects correct calculation of significant digits, students may be advised to have a pocket calculator on hand. Although questions within the tests are effectively randomized, the fixed order of questions within the lesson presentation limits potential reuse of the disk. The quantitative feedback and analysis of error provided during the post-test should enable students to recognize their weak areas and do specific corrective study on these areas. Unfortunately student scores are not saved to disk.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution colored graphics are used for the animation and are coupled with combination upper/lower case lettering.

TECHNICAL CHARACTERISTICS EVALUATION

Overall technical design is very good; however, the inability to exit a drill until all ten questions are completed may be considered a drawback. The ability to obtain hard copy results of the post-test along with an analysis of areas of weakness is very useful; however, since it is unlikely that each computer in a classroom would be linked to a printer, it would be advantageous to have student scores saved to disk. Displays are well formatted and the use of animation effectively contributes to student understanding. The fact that each lesson loads totally into memory upon initial booting is a program plus.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teacher documentation in the form of a 22 page 3-ring binder provides operating instructions, outlines program objectives, and provides an overview of the disk contents.

IMPLEMENTATIONAL SUPPORT EVALUATION

Teacher documentation is well written and easy to use. The program is easy to implement in a classroom and students should be able to work independently with little or no teacher intervention.

SUMMATION

The graphics used in this program greatly enhance student understanding of rather abstract concepts.

STATUS

"Basic Concepts" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $95.00 (1985) from Merlan Scientific at the address given at the beginning of the report. This product is part of a series titled "Basic Concepts of Electricity Series" which may be purchased for $295.00 (1985). All four components ("Basic Concepts", "Introduction to Circuits", "Resistance" and "Electrical Energy") are undergoing final evaluation and their assessments may be found elsewhere in this report.

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

CELLULAR REPRODUCTION

DESCRIPTION

Title: Cellular Reproduction
Author: R. Smythe
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science
Topics: Mitosis and meiosis
Components: 1 disk and backup, user's guide (5p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $55.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

OBJECTIVES

The learner will be able to:

1. Obtain background on mitosis and meiosis.
2. View simulations of mitosis and meiosis.
3. Compare mitosis to meiosis.
4. Review cell structures involved with cellular reproduction.

PEDAGOGICAL CONTENT DESCRIPTION

The two programs contained on this disk provide demonstrations of mitosis and meiosis in animal cells. Both programs offer the same menu selection: Lesson, Non-stop display, or End of Program. In addition the "Mitosis" program also offers a quiz which involves two types of questions: definitions of key words and matching of the explanation of the stages of mitosis/meiosis with their respective names.

The lesson begins by displaying a typical animal cell in which the cell components are labelled. These labels are then removed and the student is asked to type them in. This is followed by a display of each stage of the miotic/meiotic division process followed by information describing the changes taking place.

The non-stop display option shows each stage in succession without pausing to display information.

PEDAGOGICAL CONTENT EVALUATION

The range and depth of material presented on this disk is appropriate for the target audience. The program has been designed so that it can be completed in any order, although first time users are advised to complete it sequentially. A knowledge of genetics is not a mandatory prerequisite to program use.

The definitions presented are accurate; however, the emphasis on terminology may be troublesome for some students.

The meisosis portion of the program allows the user to compare analagous phases in mitosis and this is a real program strength; however, the prophase stage ignores the rather important concept of "crossing over".

Reference to user support materials is not necessary to program operation.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction in the lesson and quiz portions consists of entering words in answer to questions or using the space bar to control rate. There is no student interaction in the non-stop display. Questions generated during the lesson portion are in pre-programmed order but quiz questions are randomized. If desired, students can elect to see the list of terms that constitute correct answers during the mitosis quiz; however, use of this option will result in a lower score.

Feedback is provided only during the quiz and consists of a simple statement informing the student that his/her answer is corrert/incorrect followed by immediate posing of the next question. Quantitative scores are given at the end of the quiz. Rate and sequence of progression is user controlled through menu selection and key presses; the amount of material presented at one time is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technqiue is appropiate to the topic and student interaction is consistent. Questioning is weak as the questions are presented at a very low taxonomic level and, in the lesson portion, are in a pre-programmed order with no return to incorrectly answered items. Also incorrect answers to questions which require a fill in the blank response merely present the correct answer with no clues or second attempts given. Evaluation is likewise weak in that while a score is temporarily displayed in the quiz section, no evaluation takes place during the lesson. Furthermore progression in the program is not related to a demonstrated knowledge of any concept.

It is unfortunate that the "Meiosis" section does not contain a quiz similar to that given in the "Mitosis" section.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution, full-screen color graphics are used in this program.

TECHNICAL CHARACTERISTICS EVALUATION

The double-spaced displays are easy to read but letter-by-letter text generation is slow. Although most displays are clear, those cell diagrams with text at both the bottom and top of the screen tend to be cluttered. Since chromosomes are identifiable by size and shape as well as by color, use of a color monitor is not mandatory but certainly adds interest.

The program is relatively crash proof; however, error messages are not very consistent. For example, entering "nucle" for "nucleus" gives the error message "Watch your spelling" while entering "nucle" for "nuclear membrane" or "cen" for "centrioles" is acceptable.

SUMMATION

This program is easy to use and content range, sequence and depth are appropriate for high school use. The ability to compare the various phases of mitosis and meiosis is a sufficient program strength to offset the weaknesses in questioning, evaluation and technical design noted earlier.

STATUS

"Cellular Reproduction" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk may be purchased for $55.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

ELECTRICAL ENERGY

DESCRIPTION

Title: Electrical Energy
Series: Basic Concepts of Electricity Series (#4)
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 247 Armstrong Avenue, Georgetown, Ontario L7G 4X6
Subject: Science
Topics: Energy in circuits, electric power, cost of electricity
Components: 2 disks & backups, teacher's guide (17p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore PET/64

Version: 1983
Display Language: English
Cost: $95.00 (1985)
Tel. #: (416) 877-0171
Users: Grades 10 - 12

OBJECTIVES

ENERGY AND CIRCUITS:

1. Given three of the current in an electrical device, the potential difference across it, the time for which the current flows, and the energy used (in joules), to calculate the fourth.

ELECTRIC POWER:

1. Given the time taken to consume a certain amount of energy, to calculate the power used.
2. Given the potential difference across a circuit and the current through it, to calculate the power of the circuit.
3. Given two of the current in a circuit, the potential difference across it and the power used, to calculate the third.

COST OF ELECTRICITY:

1. Given the power rating of an appliance and the time for which it is operated, to calculate the energy used in units of kilowatt hours.
2. Given the power rating of an appliance, the time for which it is operated, and the cost of electricity (per kilowatt hour), to calculate the cost of the energy used.

PEDAGOGICAL CONTENT DESCRIPTION

The programs on this disk cover the following concepts:

1. ENERGY IN CIRCUITS - defines $E=VQ$ and illustrates how this equation is combined with $I=Qt$ to form $E=VIt$.
2. ELECTRIC POWER - defines $P=E/t$ and illustrates how this equation is combined with $E=VIt$ to form $P=VI$.
3. COST OF ELECTRICITY - redefines $E=Pt$ using more appropriate (larger) units (e.g. for energy-kilowatt hours) for E, P, and t to determine cost.

Each of the programs contains an optional drill consisting of ten problem exercises related to the permutations of the formula covered in the lessons. A separate test disk contains 15 multiple choice questions based upon the three lessons. Scores, diagnostic information and an optional printout are provided.

PEDAGOGICAL CONTENT EVALUATION

The presentation and development of each concept is logical and well ordered and animation is used effectively to reinforce concepts. Definitions and explanations are provided where necessary. Range, content and depth are appropriate to the target audience, however two minor errors in content were noted:

1. A spelling error ("recomment" for "recommend") occurs at the end of the drill on electric power.
2. The user is informed the test will consist of 12 questions, however 14 questions are presented.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, entering single letter answers, or entering short words/phrases to complete a sentence. Questions within each lesson are presented in a fixed order, however review questions to test student understanding are randomized from a limited test bank. Correct answers receive positive textual feedback such as "Great Work" and close answers receive a cautionary message such as "Almost, but form could be improved". Feedback to incorrect answers informs the student the answer is wrong and the program usually allows a second attempt before presenting the correct answer. If a number of questions are answered incorrectly the program may repeat the instructional material again. Quantitative feedback is provided continually throughout the drills and encourages the student to get a perfect score.

The test diskette gives the user a choice of quantitative feedback after each question or at the end of the test. The user is also given the opportunity of reviewing the questions and is provided with an explanation of the concept that pertains to the questions answered in error. If a printer is available, a hardcopy printout of the student's score and a diagnosis of areas of weakness can be made.

Sequence and rate are user controlled; amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

This program allows ample student interaction and the error checking routines for close but incorrect responses is very good. Since the program expects correct calculation of significant digits, students may be advised to have a pocket calculator on hand. The fill in the blanks questions do not accept abbreviations consistently. For example, the program accepts "s" as an abbreviation for second but will not accept "J" as an abbreviation for joule. Although questions within the tests are effectively randomized, the fixed order of questions within the lesson presentation limits potential reuse of the disk. The quantitative feedback and analysis of error provided during the post-test should enable students to recognize their weak areas and do specific corrective study on these areas. Unfortunately student scores are not saved to disk.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are coupled with combination upper/lower case lettering.

TECHNICAL CHARACTERISTICS EVALUATION

Overall technical design is very good, however the inability to exit a drill until all ten questions are completed may be considered a drawback. The ability to obtain hard copy results of the post-test along with an analysis of areas of weakness is very useful; however, since it is unlikely that each computer in a classroom would be linked to a printer, it would be advantageous to have student scores saved to disk. Displays are well formatted and the use of animation effectively contributes to student understanding. The fact that each lesson loads totally into memory upon initial booting is a program plus.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teacher documentation in the form of a 22 page 3-ring binder provides operating instructions, outlines program objectives, and provides an overview of the disk contents.

IMPLEMENTATIONAL SUPPORT EVALUATION

Teacher documentation is well written and easy to use. The program is easy to implement in a classroom and students should be able to work independently with little or no teacher intervention.

SUMMATION

The graphics used in this program greatly enhance student understanding of rather abstract concepts. Helpful feedback, printed quantitative analysis of student learning, and branching for review all contribute to the instructional strength of this package.

STATUS

"Electrical Energy" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $95.00 (1985) from Merlan Scientific at the address given at the beginning of the report. This product is part of a series titled "Basic Concepts of Electricity Series" which may be purchased for $295.00 (1985). All four components ("Basic Concepts", "Introduction to Circuits", "Resistance" and "Electrical Energy") are undergoing final evaluation and their assessments may be found elsewhere in this report.

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

GENERAL CHEMISTRY

DESCRIPTION

Title: General Chemistry
Series: Prelab Studies for General, Organic and Biological Chemistry, Part I
Authors: Sandra L. Olmsted & Richard D. Olmsted
Publisher: John Wiley & Sons
Source: 605 Third Avenue, New York, NY 10158
Subject: Science
Topics: See Pedagogical Content Description
Components: 4 disks, guide (30p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $200.00 U.S. (1985)
Tel. #: (212) 850-6000
Users : High School +

OBJECTIVES

Learners will be able to: identify personal and chemical safety procedures; utilize proper techniques with top-loading balances and graduated glassware; explain the Laws of Conversation of Mass and Definite Proportions using a balanced chemical equation; balance chemical equations and identify excess amounts of a reactant; verify a chemical change by calculating mole amounts from experimental results; explain and predict water's ability to dissolve ionic and polar substances; define colloids and explain some properties; define osmosis, dialysis, back pressure and applications to the living systems; define acids and bases using the Bronsted Theory and to explain the strengths of each; define and calculate pH's of acids and bases; and define, explain and predict hydrolysis.

PEDAGOGICAL CONTENT DESCRIPTION

This package consists of four disks:

DISK ONE: LABRATORY TECHNIQUES AND OPERATIONS

A. "Safety Review Exercise": Thirty questions about general lab safety (wearing apparel, proper conduct, disposal of materials, eye protection, etc.) are posed with an emphasis on "What should I do now" situations.

B. "Laboratory Techniques and Operations": Using a simulation format, this program presents proper techniques for use of the Mettler balances, graduated cylinders, burets and pipets.

DISK TWO: WEIGHT, MOLES AND STOICHIOMETRY

A. "Mole and Weight Relationships: Stoichiometry": This review explains the Law of Conservation of Mass and the Law of Definite Proportions with respect to balanced equations.

B. "Relationships Between Moles of Reactants and Moles of Products": A 5 question drill on balancing equations using a given number of moles, mass or volume of one substance is followed by three additional questions involving balancing equations and determining the identity and amount of the excess reactant.

C. "Weight Relationships in Chemical Changes: A Simulated Experiment": In this interactive exercise students analyze the reaction of lead metal in a copper ion solution.

DISK THREE: WATER, SOLUTIONS AND COLLOIDS

A. "Water as a Reactant": Text and animation are used to define dipole, polarity and hydration. Three simulations show the dissolving of sodium chloride, ammonia and methanol in water.

B. "Colloids and Colloidal Behavior": This program describes what a colloid is, explains why colloids do not precipitate and outlines what changes will initiate coagulation. Silver chloride and milk protein are used as examples.

C. "Osmosis and Dialysis": This program defines membrane types, osmosis and dialysis and simulates osmotic pressure and dialysis as it occurs in the exchange of nutrients and wastes in circulatory system.

DISK FOUR: ACIDS AND BASES

A. "The Bronsted Theory Revisited": Using definitions and animation, acids, bases, strong versus weak, and conjugate acid/base pairs are explained in terms of proton donation or acceptance.

B. "A pH Review": This program includes a definition of pH, provides examples of how to calculate pH from the hydroxide ion concentration, and includes drill questions on pH concentrations.

C. "Hyrolysis of Salts": Several examples of hydrolysis of salts illustrate how to recognize when an ion should interact with water and how to predict the result. Animations, experimental results and questions emphasize the properties of ions and their resulting solutions.

D. "Buffers": After reviewing the differences between strong and weak acids and bases, this program defines a buffer and graphically illustrates its operation using the mono- and dibasic hydrogen phosphate system. A 6 question true/false quiz summarizes the properties of a buffer.

E. "Mechanics of a Titration" - an overview of titration apparatus, use, safety and technique.

F. "Determination of a Molecular Weight: A Simulated Titration": The student reads a buret and then uses the average molecular weight to identify the unknown acid from a list of eight monoprotic, organic acids.

PEDAGOGICAL CONTENT EVALUATION

Most of the material covered in these programs is at an appropriate depth with good sequence and range for high school chemistry students. They are designed as an adjunct to regular labratory and classroom work and are generally not designed as stand alone units. Programs can be accessed in any order from the menu, thus allowing good flexibility. Topics are well illustrated with graphics and explanations, but are limited both in the number of examples provided as well as in the amount of drill questions. Minor inaccuracies in content can be found, for example the use of "weight" instead of "mass", use of "ml" instead of "mL", etc.

INSTRUCTIONAL FORMAT DESCRIPTION

After program selection from the main menu, student interaction consists of page turning (space bar), answer inputs, use of the left arrow key for correction, and the option to use the "ESC" key to return to the menu. All questions are objective in nature (i.e. yes/no, multiple choice, instrument readings, etc.) and occassionally are randomized from a limited test bank. Feedback consisting of an audio tone and a short message (ranging from simple presentation of the correct answer to a detailed explanation) is given after each question. Sequence and amount are generally program controlled; rate is user controlled.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction, feedback, explanations, instructional techniques and question types are generally effective in providing review of the topics after classroom instruction has been given. Simulations are excellent and use graphics effectively to promote understanding of the topic under consideration. Interaction is consistent, but the amount of practice available is generally very limited. Sequencing within the programs may be too rigid due to lack of help branches as well as the necessity of always starting at the beginning. While immediate feedback is available after every response, all programs lack summative feedback.

TECHNICAL CHARACTERISTICS DESCRIPTION

Text is displayed in upper/lower case letters with single and double spacing used. The option of double width letters is available. Italics highlight key words and phrases and high resolution graphics are used in animations. Sound accompanies all student answer inputs: a musical tone is used for correct reponses; a buzz for incorrect responses. Chemical symbols are correctly presented with sub- and superscripts. Minimal color is used.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are excellent with clear screen layouts and effective use of scrolling to keep pertinent data in view. Graphics are of high quality and enhance the instruction. Input methods are generally consistent; however, occasionally it is unclear whether pressing the space bar will erase an incorrect answer or produce a new page. The programs are easy to use and appear to be completely bomb proof. Sound unfortunately cannot be disabled. Limited color is used and use of a monochrome monitor would not affect instructional quality.

SUMMATION

The content of this package is generally appropriate and effective for use for high school students. Clear, concise explanations, effective content development, and excellent graphics combine to make the programs useful for review and remedial purposes. Weaknesses of this package include insufficient question randomization, inadequate practice, and lack of quantitative evaluation.

STATUS

"General Chemistry" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $200 U.S. (1985) from John Wiley and Sons at the address given at the beginning of the report. Canadian offices are at 22 Worchester Road, Rexdale, ON M9W 1L1 (416) 675-3580. The product is guaranteed against defect for 90 days; subsequently, damaged disks can be replaced for $15.00 U.S.

HYDROGEN SPECTRUM

DESCRIPTION

Title: Hydrogen Spectrum
Author: None cited
Publisher: Heinemann Computers in Education
Source: c/o Gage Publishing Ltd., 164 Commander Blvd, Agincourt, ON M1S 3C7
Subject: Science
Topics: Relationship between hydrogen spectral lines and electron energy emissions
Components: 1 diskette and backup, user booklet (8p.), user guide (24p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Display Language: English
Cost: $85.00 (1984)
Tel. #: (416) 293-8141
Users: Grades 10 - 12

OBJECTIVES

This program is designed to provide a dynamic model to facilitate understanding of the interpretation of the line emission spectrum of atomic hydrogen in terms of electronic transitions between energy levels.

PEDAGOGICAL CONTENT DESCRIPTION

This disk offers two programs:

Program One is designed as a teacher demonstration tool to illustrate the correspondence between energy emissions as electrons jump from high to low energy levels and the spectral lines emitted by the hydrogen atom. Within the program the teacher may: 1) Vary display speeds or proceed step-wise through absorptions and emissions. 2) Control the level to which an electron is moved. 3) Highlight the spectral area associated with one particular series (Lyman Balmer, Paschen, etc.) 4) Include or exclude a background spectrum which shows with reduced heights where all spectrum lines under consideration can occur. 5) Include or exclude dials which show the energy absorbed or emitted as each electron transition occurs.

Program Two, designed to be used by the student in conjunction with a workbook, guides the user through a series of exercises designed to promote familiarity with the energy level emission model, to discover the proportionality between spectral line frequency and energy differences, and hence to use graphs to evaluate Planck's constant.

PEDAGOGICAL CONTENT EVALUATION

Program One offers good instruction and could be used by the teacher in conjuction with classroom teaching to provide students with the necessary background to begin Program Two. The range of content is appropriate to the target audience, however it does assume that students have had prior experience with graphing and graphical interpretation. Content sequencing is effective as it leads the user from the general to the particular.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of letter selection of menu items, using the space bar for page advancement, utilization of the ESC key for paging backward, and using the arrow keys or special letter keys to activate displays. Questions posed in the student booklet correspond to graphic displays on the disk. The student is advised to have a calculator, paper for recording data and a sheet of graph paper while doing the program. Upon entering a calculated answer, the computer provides feedback in the form of "Correct" or "Incorrect" accompanied by instructions to observe a highlighted area of the screen which is critical in answering the question correctly. The correct answer is then displayed in this position. Although there is no quantitative feedback, questions within the tutorial must be answered to a minimum level of proficiency to allow progress in the tutorial.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction is well suited to the target audience and does not require great computer familiarity. The simulation technique is effective in providing an understanding of abstract concepts. The user is active in the program with each page requiring at least one and sometimes several responses, depending upon the success rate.

Feedback techniques lack variation. Negative feedback is weak in that it does not indicate possible reasons for an error, and the repetitive "correct" given as positive feedback does not prove motivational. Completing the program in its entirety takes at least 2 1/2 hours, however different portions of the tutorial program may be completed in stages, or only those sections that the the instructor feels will be beneficial may be done. Rate is effectively user controlled throughout the program.

TECHNICAL CHARACTERISTICS DESCRIPTION

The program makes extensive use of a particular screen format in which the top two-thirds of the screen are used for a high resolution graphics display of the relationship between spectral line and the emission of level-to-level electron changes and the bottom one-third is reserved for text display in a variety of letter sizes. Sound is not used but limited color is present.

TECHNICAL CHARACTERISTICS EVALUATION

This program utilizes fine technical design with well formatted displays and easy to read text. The transfer from one display to another is smooth and logical. The ability to "zoom" in on a particular section of the spectrum for detailed study is a virtue of the program. The inclusion of on-screen commands plus the use of the ESC key to backpage makes the program easy to use, even by novice computer users.

The fact that the spectral line frequencies mentioned in the program and used to generate energy quantities are different from those shown on the spectra graphed at the bottom of the page may lead to unnecessary confusion. Also one of the user stated functions, "S" to control the rate of energy level changes, did not work as described in the program.

Although parts of the program are generated in color, clarity is often better when a monochrome monitor is used (e.g. hollow square depiction).

IMPLEMENTATIONAL SUPPORT DESCRIPTION

An 8 page student's manual (reproducible) provides instructions on program operation and includes exercises that correspond with the screen portions of the program. The 24 page teacher's guide provides instructional objectives, hints on program operation, background information, instructions for varying the parameters, and methods of altering program two and tailoring it to meet individual student needs.

IMPLEMENTATIONAL SUPPORT EVALUATION

Both the student and teacher's guide are indispensible to program operation.

SUMMATION

This disk, complete with its teacher demonstration program, employs sound instructional design and is adaptable to a wide variety of classroom situations.

STATUS

"Hydrogen Spectrum" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $85.00 from Gage Publishing Ltd. at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, damaged disks may be replaced for $52.95.

IDEAL GASES

DESCRIPTION

Title: Ideal Gases
Series: Introduction to General Chemistry
Authors: Stanley G. Smith, Ruth Chabay & Elizabeth Kean
Publisher: COMPress
Source: P.O. Box 102, Wentworth, NH 03282
Subject: Science
Topics: Boyle's Law, Charles' Law, pressure-temperature relationship
Components: 1 disk, backup, guide (2p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Display Language: English
Cost: $70.00 U.S. (1984)
Tel. #: (603) 764-5831
Users : Senior High +

OBJECTIVES

After completing this program, students will be able to:

1. Describe atmospheric pressure.
2. Know how to use a barometer.
3. Define Boyle's Law, Charles' Law, and the pressure-temperature relationship of an ideal gas.
4. Solve problems dealing with the gas laws outlined in #3.

PEDAGOGICAL CONTENT DESCRIPTION

This program is divided into four sections. The first section on "Atmospheric Pressure" is an introductory tutorial which defines atmospheric pressure and illustrates a method of measuring it. The remaining three sections offer simulations illustrating Boyle's Law, pressure-temperature experiments and Charles' Law and provide sample problems for practice.

User support materials include a sheet explaining answer entry, symbols used to correct misspelled entries, escape, answer help and back-paging features of the program.

PEDAGOGICAL CONTENT EVALUATION

The range, depth, and sequencing are all appropriate for the target audience. Good examples and illustrations are used to clarify textual content. Two inaccuracies were noted: incorrect spellings (e.g. "subtacted" and "reploted" in the pressure-temperature experiment) and scale readings which allow answer inputs beyond a reasonable degree of precision (e.g. 6.8269354 for 6.8). This is inconsistent with the use of significant digits and proper scale reading format.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of program selection, entry of word responses or numerical answers and page turning via the RETURN key. Questions within the tutorial are presented in a pre-programmed order; however, practice problems are randomly chosen within a given range of parameters.

Immediate feedback is provided for all user responses: a correct answer produces the message "OK" accompanied by three musical tones; an incorrect answer produces the message "No" followed by a hint. The correct answer is given after two incorrect attempts. A cumulative scoreboard at the top of the screen keeps track of the number of correct responses and the number of problems remaining.

The amount of information presented is program controlled; however, the user maintains control of both sequence and rate.

INSTRUCTIONAL FORMAT EVALUATION

The instructional format employed is educationally sound in that it allows for varying rates of learning and yet demands a certain level of competency. The user is given the opportunity of generating data from a simulated experiment and is guided through sample problems. Questions in the drill and practice section are effectively randomized; however, they tend to follow predictable patterns in the tutorial sections. Feedback is good. It is non-threatening and immediate and allows for variability within limits of scale readings. The built-in program function to detect spelling errors effectively distinguishes between a wrong answer and a typographical error.

TECHNICAL CHARACTERISTICS DESCRIPTION

Graphics and sound are used in this program. Varying styles of type are used for emphasis.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are well formatted and easy to read. Transitions from display to display are smooth and well-paced. The animated isolation of a variable in an equation aids student understanding.

Negative features relating to technical design include:

1. The program advises a maximum of eight data readings for experiments; however, it allows entry of additional readings. This fouls up subsequent displays of the relationship between the variables by double printing on some lines. Display printing may also be fouled up by entry of an excessively long character string.
2. The scale markings used in the Boyle's law simulations are confusing.
3. The use of the computer as a calculator, while excellent in theory, is a fairly complicated procedure in this program and requires some programming ability. In essence it takes longer and is more complicated than doing the same calculation on a hand calculator.

SUMMATION

This program effectively utilizes the computer's graphic generation ability to provide interesting simulations and effective drill and practice on problems related to gas laws.

STATUS

"Ideal Gases" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $70.00 U.S. (1984) from COMPress at the address given at the beginning of the report. Defective diskettes will be replaced without charge within a 90 day warranty period. Thereafter, a replacement disk may be purchased for $10.00 upon return of the damaged diskette.

INTRODUCTION TO CIRCUITS

DESCRIPTION

Title: Introduction to Circuits
Series: Basic Concepts of Electricity Series (#2)
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 247 Armstrong Avenue, Georgetown, Ontario L7G 4X6
Subject: Science
Topics: Meters, currents in circuits, potential differences
Components: 2 disks & backups, teacher's guide (17p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore PET/64

Version: 1983
Display Language: English
Cost: $95.00 (1985)
Tel. #: (416) 877-0171
Users: Grades 10 - 12

OBJECTIVES

A. METERS - After completing this program students will be able to:

1. Distinguish between series and parallel connections.
2. Wire an ammeter into a circuit to measure the current through some part of the circuit.
3. Wire a voltmeter into a circuit to measure the voltgage across some part of the circuit.

B. CURRENT IN CIRCUITS - Given an electrical circuit diagram containing simple series and/or parallel networks of resistors and the current though various parts of the circuit, students will be able to calculate the current through other parts of the circuit.

C. POTENTIAL DIFFERENCE IN CIRCUITS - Given an electric circuit diagram containing simple series and/or parallel networks of resistors and the potential difference across various parts of the circuit, students will be able to calculate the potential difference across other parts of the circuit.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains three programs:

METERS - This program explains the concepts of series and parallel connections, introduces the electric cell as a power source, illustrates the ammeter as a device which measures electric current, and explains the function and correct wiring of a voltmeter.

CURRENT IN CIRCUITS - The lesson portion of this program reviews the meaning of series circuits and has a student use a simulated ammeter to measure the current leaving the cell in series circuit and then make predictions concerning the value of the current at other locations.

POTENTIAL DIFFERENCES IN CIRCUITS - This lesson begins by studying the potential difference in a simple parallel resistor network. Using a graphic representation of a circuit containing two resistors wired in parallel and connected to a cell, the student measures the potential difference across the cell using a voltmeter and is lead through a series of exercises to discover the rule for resistors connected in series, the potential difference across the entire resistor network is the same as the sum of the potential differences across the individual resistors.

Programs two and three each include an optional drill consisting of ten problem exercises related to the program. A separate test disk contains 15 multiple choice questions based upon the three lessons. Scores, diagnostic information and an optional printout are provided.

PEDAGOGICAL CONTENT EVALUATION

The presentation and development of each concept is logical and well ordered. Animation is used effectively to illustrate textual descriptions and clarify abstract concepts. Range, content and depth are appropriate to the target audience, however three errors in content were noted: 1) The Potential Difference program presents a display of two resistors in series with voltmeters showing voltage drops of 1.5V and 3.0V. Underneath this display the text correctly identifies the total voltage drop as 4.5V, but incorrectly identifies the first voltage drop as 2.5V. 2) The text introducing the test on disk two indicates that 12 questions will be posed; in reality 16 questions are generated. 3) Question #1 of the test incorrectly identifies "b" as the correct response--the answer should be "c".

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, entering single letter answers, or entering short words/phrases to complete a sentence. Questions within each lesson are presented in a fixed order, however review questions to test student understanding are randomized from a limited test bank. Correct answers receive positive textual feedback such as "Great Work" and close answers (e.g. entering a synonym for a word) receive a cautionary message such as "Hold on now". Feedback to incorrect answers informs the student the answer is wrong and the program usually allows a second attempt before presenting the correct answer. If a number of questions are answered incorrectly the program may repeat the instructional material again. Quantitative feedback is provided continually throughout the drills and encourages the student to get a perfect score.

The text diskette gives the user a choice of quantitative feedback after each question or at the end of the test. The user is also given the opportunity of reviewing the questions and is provided with an explanation of the concept that pertains to the questions answered in error. If a printer is available, a hardcopy printout of the student's score and a diagnosis of areas of weakness can be made.

Sequence and rate are user controlled; amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The method of moving from the concrete to the abstract via example is instructionally sound. The program allows ample student interaction and the error checking routines for close but incorrect responses is very good. Since the program expects correct calculation of significant digits, students may be advised to have a pocket calculator on hand. Although questions within the tests are effectively randomized, the fixed order of questions within the lesson presentation limits potential reuse of the disk. The quantitative feedback and analysis of error provided during the post-test should enable students to recognize their weak areas and do specific corrective study on these areas. Unfortunately student scores are not saved to disk.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are coupled with combination upper/lower case lettering.

TECHNICAL CHARACTERISTICS EVALUATION

Overall technical design is very good, however the inability to exit a drill until all ten questions are completed may be considered a drawback. The ability to obtain hard copy results of the post-test along with an analysis of areas of weakness is very useful; however, since it is unlikely that each computer in a classroom would be linked to a printer, it would be advantageous to have student scores saved to disk. Displays are well formatted and the use of animation effectively contributes to student understanding. The fact that each lesson loads totally into memory upon initial booting is a program plus.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teacher documentation in the form of a 22 page 3-ring binder provides operating instructions, outlines program objectives, and provides an overview of the disk contents.

IMPLEMENTATIONAL SUPPORT EVALUATION

Teacher documentation is well written and easy to use. The program is easy to implement in a classroom and students should be able to work independently with little or no teacher intervention.

SUMMATION

The graphics used in this program greatly enhance student understanding of rather abstract concepts. Helpful feedback, printed quantitative analysis of student learning, and branching for review all contribute to the instructional strength of this package.

STATUS

"Introduction to Circuits" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $95.00 (1985) from Merlan Scientific at the address given at the beginning of the report. This product is part of a series titled "Basic Concepts of Electricity Series" which may be purchased for $295.00 (1985). All four components ("Basic Concepts", "Introduction to Circuits", "Resistance" and "Electrical Energy") are undergoing final evaluation and their assessments may be found elsewhere in this report.

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

LAWS OF MOTION

DESCRIPTION

Title: Laws of Motion
Author: None cited
Publisher: Educational Materials and Equipment Co.
Source: P.O. Box 17, Pelham N.Y. 10803
Subject: Science
Topics: Experiments on the inclined plane and in free fall; experiments on the A-machine
Components: 2 disks, teacher guide (28p.)
System Requirements: Apple II+ only, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model I/III

Version: 1982
Display Language: English
Cost: $103.50 U.S. (1984)
Tel. #: (914) 576-1121
Users : High School +

OBJECTIVES

After completing the two disks in this package, the student will be able to:

1. Understand the variables which affect the motion of objects.
2. Predict the effects of manipulating one or more variables.
3. Evaluate hypotheses in light of experimental results.
4. Compare the laws of motion in different physical "worlds" of Newtonian and Aristotelian physics called "stagira" and "wcolsthrope" in these programs.
5. Enhance data interpretation and graphing skills.
6. Design experiments and plan a research project.

PEDAGOGICAL CONTENT DESCRIPTION

This program contains two disks:

1. EXPERIMENTS ON THE INCLINED PLANE AND IN FREE FALL allows a student to manipulate the angle of a plane to 90 degress to simulate free fall.
2. EXPERIMENTS ON THE A-MACHINE allows students to experiment with an apparatus consisting of a horizontal board with a pulley mounted on one end. A movable block is placed on the board and attached by a string to a variable weight which is strung over the pulley.

Both programs allow the student to select from a menu the physical "world" to use as well as the variables to be changed. Once the variables have been set the user has the option of selecting from a menu the desired display. The options for display are; 1) the block's motion; 2) "snapshots" of the motion of a series of stroboscopic pictures; 3) a graphic display of the block's position and velocity versus time; 4) a table displaying the numerical data from the simulation; 5) a hard copy print out of results or 6) quit the simulation.

PEDAGOGICAL CONTENT EVALUATION

Both content range and depth are appropriate for the target audience. The program is designed to follow in-class theory on inclined planes and the A-machine and it therefore assumes that students have a working knowledge of Aristotelian and Newtonian physics plus exposure to lab apparatus of similar design.

There is no evident sequencing in the programs since users can select variables at will. Although the program accomplishes some fairly sophisticated calculations (which are not displayed or explained) and displays the resulting data clearly, it provides no explanation of how the results occur. Teacher intervention and direction is therefore mandatory to ensure student learning.

Although no student materials are provided with the programs, the teacher's guide provides rationale, objectives, suggested teaching strategies and sample questions.

INSTRUCTIONAL FORMAT DESCRIPTION

User interaction consists of selecting from the menu the variables to be changed, choosing the type of physical world (Newtonian or Aristotelian), and selecting the display type desired for the results of a given simulation. The user may re-select a display type at any time.

INSTRUCTIONAL FORMAT EVALUATION

The instructional format of this program is its greatest weakness. The simulations and data presentations are good; however, the program cannot be used as a stand-alone teaching tool due to the fact that student interaction and feedback are minimal and questioning and evaluation are non-existent. The student is basically a passive observer of a very complex phenomena.

TECHNICAL CHARACTERISTICS DESCRIPTION

Displays are in high resolution, color graphics. Standard size text is used. Sound (beeps) accompanies the simulated motions and fills in time gaps as the computer carries out calculations.

TECHNICAL CHARACTERISTICS EVALUATION

This program utilizes fine technical design. Size of type is appropriate for the target audience, transition from display to display is smooth, and the program is generally easy to use. Graphics are quickly and clearly generated, and the accompanying tonal changes effectively draw attention to changes in velocity.

Unfortunately the program operates only on the Apple II+ and will not function on the IIe.

SUMMATION

This program when used as a simulation does an excellent job of presenting a study of motion involving Newtonian and Aristotelian ideas. However, the lack of questioning, feedback and evaluation related to the concepts being portrayed necessitates active teacher intervention in order to ensure student understanding.

STATUS

"Laws of Motion" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $103.50 U.S. (1984) from Educational Materials & Equipment Company at the address given at the beginning of the report. Any non-functioning disk will be replaced at no charge as long as the publisher is assured that the disk rather than the hardware is the source of the problem. This warranty applies as long as the program is published.

LENSES

DESCRIPTION

Title: Lenses
Author: None cited
Publisher: Heinemann Computers in Education
Source: c/o Gage Publishing Ltd., 164 Commander Blvd, Agincourt, ON M1S 3C7
Subject: Science
Topics: Concave and convex lenses; plane, concave and convex mirrors
Components: 1 disk and backup, manual (27p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Display Language: English
Cost: $85.00 (1985)
Tel. #: (416) 293-8141
Users : Grades 9 - 12

OBJECTIVES

This disk is designed to:

1. Supplement the teaching of optics by conventional experiments.
2. Provide the teacher with a convenient method of diagraming the situations involving convex and concave lenses and plane, concave and convex mirrors.
3. Provide quick access to graphs to show the relationship between the variables involved in mirrors and lenses.

PEDAGOGICAL CONTENT DESCRIPTION

This program is a simulation of light incidence on convex and concave lenses and on plane, convex and concave mirrors. The simulation graphically provides answers to the question "What will happen if...?" as it allows the user the option of toggling virtual rays and images, changing the size of the object, lens or mirror, and altering the focal length or the position of the object. (In the case of a plane mirror, changing the slant is also possible.)

Tables giving details of the images (nature, relative and actual size, orientation and image distance) may be superimposed on the diagram. Graphs may also be plotted showing relationships between object and image distances.

PEDAGOGICAL CONTENT EVALUATION

Program content is accurate and offers a good depth of coverage. The range is excellent as all classes of mirrors and lenses are discussed. Optical units may be chosen in any order and almost any combination of parameters may be tested.

The graphing options are more suitable to advanced physics than to high school study; however, they are very interesting and may prove motivating to advanced students as an extension or challenge area of study. Both the format of the teaching guide and the number of keys involved in changing the screens and toggles would suggest that the program is primarily designed for use as a demonstration tool by teachers, and as such it is an effective simulation.

INSTRUCTIONAL FORMAT DESCRIPTION

Student/teacher interaction consists of hitting any one of 32 different keys to activate toggle tables, choose optical units, change parameters, draw/erase rays, toggle the image, present information about the image, or draw graphs. There is no questioning as such in this program. Feedback consists of a change in the screen image to reflect that command activated by a key stroke. Program rate, sequence and amount are all user controlled.

INSTRUCTIONAL FORMAT EVALUATION

This simulation is a comprehensive, accurate, and relatively easy to use program on mirrors and lenses. It is not designed as an individual teaching tool, but has strength more as a teacher demonstration program. The options to investigate several situations for each of the topics provides a convenient tool for instruction; however, the teacher is required to guide students through the demonstration with meaningful examples and discussion.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are used to depict ray diagrams for mirrors and lenses. Color is used but is not mandatory to program operation. Sound is not used. Standard combination upper/lower size text is used and a help screen is available at any point in the program by pressing ESCAPE.

TECHNICAL CHARACTERISTICS EVALUATION

Graphics are clear, well formatted, and easy to follow. The number of key commands needed to gain full use of the program is a little overwhelming in the beginning, but with the guidebook, information page display, and about one-half hour of learning time, the user can become comfortable with them. The program offers excellent flexibility and complete freedom to move back and forth between the available options.

SUMMATION

After students have had some "hands on" lab work with optics, this program provides an excellent means for the teacher to quickly and clearly demonstrate the effects of changes to mirrors and lenses.

STATUS

The package "Lenses" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $85.00 (1985) from Gage at the address given at the beginning of the report. Damaged diskettes may be replaced free of charge within a 90 day warranty period. Subsequently, damaged disks may be replaced for $32.95.

LONGITUDINAL WAVE DEMONSTRATIONS

DESCRIPTION

Title: Longitudinal Wave Demonstrations
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science
Topics: Single pulses, periodic longitudinal waves
Components: 1 disk and backup, user's guide (1p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore Pet & 64

Version: 1983
Display Language: English
Cost: $37.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

OBJECTIVES

The program is designed to provide a visual aid for the instructor in demonstrating longitudinal waves.

PEDAGOGICAL CONTENT DESCRIPTION

The program supplies three animated graphic displays - single pulses, continuous wave and two continuous waves in a spring. The user may alter the speed of the wave, select freeze motion or highlight a single coil of the spring to display its motion.

PEDAGOGICAL CONTENT EVALUATION

The displays for single pulse and a continuous wave are very well done but unfortunately the display of the two continuous waves is quite weak. The spring carrying the two continuous waves is not clearly shown and the illusion is given that the spring is twice the size and is broken in two so that each side operates independently of the other side. The spring can appear out of phase with itself.

INSTRUCTIONAL FORMAT EVALUATION

The program is designed as a demonstration and as a result there is no instructional design.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution graphics are used to display the spring and the movement of the wave in the spring. A high resolution generated character set is employed to present text.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are clear and concise and are directed toward one concept at a time. The demonstration of the two continuous waves has distracting flaws and is of questionable use.

SUMMATION

The disk does show the wave pulses and continuous wave reasonably well and these are a good use of the computer medium. However, the value of the third demonstration is questionable and due to the limited content presented, the usefulness of the entire disk is affected.

The disk does not have an instructional component and, as such, it would not generally fall within our search area. That and the unsuitability of one third of the content would normally result in the product being rejected. However, the disk is part of a series which, in its entirety, is quite good. This disk is the only weak part. While we would not recommend that this demonstration be purchased on its own, it may serve a purpose within the larger context of the full series. As the series price is well below the sum of the individual disk prices, it would not be overly disadvantageous to purchase the demonstration as part of the full series.

STATUS

"Longitudinal Wave Demonstrations" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $37.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150.00 It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

OIL DROP

DESCRIPTION

Title: Oil Drop
Series: Physics Interact
Author: James Friedland
Publisher: Edutech
Source 303 Lamartine St., Jamaica Plain, MA 02130
Subject: Science
Topics: Millikan Oil Drop Experiment
Components: 1 disk, backup, user's guide (7p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, game paddles, color monitor optional
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Display Language: English
Cost: $110.00 U.S. (1984)
Tel. #: (617) 965-4813
Users : High School

OBJECTIVES

This disk is designed to:

1. Provide students with an opportunity to discover the discrete nature of elementary changes.
2. Develop an understanding of the mechanics of a classic experiment and the calculations involved in it.

PEDAGOGICAL CONTENT DESCRIPTION

This disk presents two versions of Millikan's Oil Drop Experiment. In the first version, students are given the mass of an oil drop from which they must calculate the changes necessary for the drop to maintain equilibrium between the electrostatic and gravitational forces. In the second version students are given only the radius of an oil drop. They must therefore first calculate the mass and then go on to calculate the necessary changes for equilibrium balance.

PEDAGOGICAL CONTENT EVALUATION

The Millikan Oil Drop Experiment accurately portrays a classical experimental procedure. Since students can select as many oil drops as they wish on which to make measurements and calculations, both the range and depth of the material are appropriate and sufficient. The content and models used in the simulation are accurate and valid.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction in this drill and practice program consists of name input, using the game paddles to adjust stopping voltages, and entering both numerical and textual answers to a variety of questions related to the operation of the program. Feedback consists of textual reinforcement for correct responses or a suggestion to redo a calculation if an error is made. If the teacher so chooses, each student's experimental results may be printed and displayed.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique employed is appropriate for the target audience and effective in meeting program objectives. The fact that the program both checks the accuracy of an input and records it for subsequent teacher and student perusal is a positive feature.

TECHNICAL CHARACTERISTICS DESCRIPTION

Sound and color are used in the title frames. There is basically just one graphical display--namely a schematic diagram of the experimental apparatus.

TECHNICAL CHARACTERISTICS EVALUATION

Technical quality is excellent. Displays are clear, easy to read, free of errors, and appropriate to the target audience. While color and sound add interest, they are not integral to program operation.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Support materials consist of a 7 page teacher's guide which provides background information related to the physics involved in the program and describes the use of the management system. The student guide includes both theoretical background and a lab sheet.

The management system maintains class lists, provides individual student score data, and allows data to be printed in table or graphic form for further analysis.

IMPLEMENTATIONAL SUPPORT EVALUATION

Support documentation provides excellent background information necessary to program operation. The management system, which has a capacity of about 24 students, is easy to use. The fact that it lists students by last name only and does not provide differentiation by classes is a minor disadvantage.

SUMMATION

This program provides a clear and realistic simulation of Millikan's Oil Drop Experiment.

STATUS

"Oil Drop" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $110 U.S.(1984) from EduTech at the address given at the beginning of the report. A package of six disks and six manuals costs $285 U.S. Diskettes which are damaged for any reason will be replaced without charge within a 2 year warranty period.

In Alberta, EduTech product are sold by Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

PERIODIC MOTION

DESCRIPTION

Title: Periodic Motion
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science

Version: 1983
Display Language: English
Cost: $45.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

Topics: Periodic motion, cycle, longitudinal & transverse vibration, amplitude, phase, period and frequency
Components: 1 disk and backup, user's guide (3p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor, stop watch
Other Formats Available (not evaluated): Commodore Pet & 64

OBJECTIVES

The student will be able to:

1. State the meaning of periodic motion and distinguish between transverse and longitudinal motion.
2. Demonstrate an understanding of the term cycle by identifying the number of cycles after observing a vibrating motion.
3. Give the time for a periodic motion after observing an example of the number of cycles.
4. Calculate frequency after being given time and number of cycles.
5. Given either frequency or period, calculate the missing quantities.
6. Given a diagram showing the path of a vibrating body, determine the amplitude of the motion.
7. Given similar vibrating motions, determine whether they are in phase, in opposite phase or out of phase.

PEDAGOGICAL CONTENT DESCRIPTION

This module contains 5 lessons on periodic motion which the user selects from a menu. Each lesson follows the general format of giving a definition of the situation, providing animated graphic examples to illustrate the definition and posing questions to test the user's understanding of the concept. In the event of a wrong response, the user is either given a detailed explanation of the correct response or is requested to re-do the problem. Each lesson closes with a review of the major terms and objectives of the lesson.

PEDAGOGICAL CONTENT EVALUATION

Content is clearly presented, is accurate and is directed to the stated objectives. The program makes the assumption that the user will progress through the lesson in sequence - a practice that the teacher should ensure. The use of animated graphics to display a point or to present a question is of great value.

Minor weaknesses are:

1. The graphing of a cycle, using a sine wave, is not explained to the user. Some confusion may arise when this 'back and forth' motion is spread out over time.
2. There are occasions when questions are posed before detailed demonstrations are presented and the user must answer them based on the definitions alone. This is not entirely inappropriate for this target audience.
3. There is some lack of depth, e.g. in the exercise portion of 1-2, the piston or pendulum always starts from the same position.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of selecting from the menu, pressing space bar to advance a frame, entering yes/no responses to various questions, entering a single word to complete a phrase, entering a numerical value based upon data extracted from the program and choosing correct items from a multiple choice list. Questions are presented in a fixed sequence.

Positive feedback consists of the presentation of a variety of expressions. Incorrect answers result in an indication that the user was wrong followed by re-presentation of the question or the program may instead go through the solution for the user. In some sections the user must obtain three correct responses in a row before being permitted to advance to the next section.

INSTRUCTIONAL FORMAT EVALUATION

The amount of student interaction is sufficient and is effective in testing the student's grasp of the items under study. Inputs are accurately evaluated as right or wrong and spelling errors are also usually recognized.

The use of a stop watch followed by data entry is an effective way of simulating an actual experiment. However, a stop watch must be available - the user can not pass over this section.

Negative feedback is reasonably good in that solutions to the question are shown.

One weakness is the non-randomization of the questions. Also, it is possible for a student to be trapped in a lesson if (s)he can not answer three questions in a row.

TECHNICAL CHARACTERISTICS DESCRIPTION

Animated graphics are used to demonstrate the concepts. A high resolution generated character set is employed to present text.

TECHNICAL CHARACTERISTICS EVALUATION

The technical aspects of the program are excellent and the program is exceptionally easy to operate.

SUMMATION

The program is not intended to replace 'hands on' work in the laboratory. However, the lessons are well done and will meet their objectives of providing an introduction to periodic motion. Weaknesses are minor only and do not detract from the overall effectiveness of the package.

STATUS

"Periodic Motion" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $45.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150. It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

PERIODIC WAVES: BASIC CONCEPTS

DESCRIPTION

Title: Periodic Waves: Basic Concepts
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science
Topics: Periodic waves, wavelength, amplitude, period and frequency.
Components: 1 disk and backup, user's guide (3p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor, stop watch
Other Formats Available (not evaluated): Commodore Pet & 64

Version: 1983
Display Language: English
Cost: $41.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

OBJECTIVES

The student will be able to.

1. Define a transverse wave.
2. Diagram a transverse wave as to crest and troughs.
3. Define the wavelength and amplitude of a transverse wave.
4. Determine the number of wavelengths, speed and/or frequency given the number of cycles executed by a source or a point in a medium.
5. Define a longitudinal wave in terms of motion of points in a medium.
6. Identify the wavelength, compressions and rarefractions of a longitudinal wave.

PEDAGOGICAL CONTENT DESCRIPTION

This module contains 4 lessons on waves which the user selects from a menu. These are:

1. An animation dealing with transverse waves and definitions of the same
2. An animation dealing with wavelength, amplitude, frequency and period definition
3. Graphics and calculations using a stop watch for finding frequency, wavelength and speed when given two of the three variables
4. An animated graphics section dealing with definitions associated with longitudinal waves, wavelengths, compressions and rarefractions.

Lessons consist of the presentation of animated graphic displays followed by questions to the student and a summary of terminology.

PEDAGOGICAL CONTENT EVALUATION

The range, sequence and depth of the topics are appropriate for the target audience.

Content is accurate; however, clarity is somewhat weak in the animated graphic sections on compression and rarefraction and the unit on transverse wave concept. The explanations are insufficient and the user may be left with the impression that the medium is moving in the same direction as the wave.

The success of the program relies to a certain extent on the user having completed earlier programs in the series.

INSTRUCTIONAL FORMAT DESCRIPTION

Using a tutorial type mode, the user is required to push the space bar to advance frames and to enter one word answers or numerical answers as obtained from stopwatch timings. The user is required to perform different tasks every few frames.

Questions come in a preprogrammed order or randomly from a limited data bank. If the user makes a mistake, the program will supply the student, in a majority of cases, with a detailed explanation. More problems of a similar type may then be presented.

INSTRUCTIONAL FORMAT EVALUATION

The amount of student interaction is sufficient, varied and effective in testing the student's grasp of the items under study. Feedback is generally good. No provision is made in the program to analyze errors but an explanation is given when errors are made. Quantitative feedback would be advantageous.

TECHNICAL CHARACTERISTICS DESCRIPTION

Animated graphics are used to demonstrate the concepts. A high resolution generated character set is employed to present text.

TECHNICAL CHARACTERISTICS EVALUATION

The technical aspects of the program are very good and the program is easy to operate. The illusion of movement for particles in the medium for transverse waves may create some difficulty for the user.

SUMMATION

In general the use of animation to present various concepts about waves and their behaviour is very well done and is a good use of the computer medium. The program should be moderately motivational to the user and would be considerably better than static textual material.

Minor weaknesses are the questioning techniques (fixed order or limited data bank only) and the lack of error analysis.

STATUS

"Periodic Waves: Basic Concepts" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $41.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150.00. It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

RAY TRACER

DESCRIPTION

Title: Ray Tracer
Author: David Vernier
Publisher: Vernier Software
Source: 2920 SW 89 Street, Portland, OR 97225
Subject: Science
Topics: Reflection and refraction of lenses and mirrors
Components: 1 disk, student's guide (5p.), teacher's guide (24p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only.

Version: 1982
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (503) 297-5317
Users : High School

OBJECTIVES

Students will be able to:

1. Apply the laws of refraction and reflection to straight and curved surfaces.
2. Predict the path of light rays through materials of different refractive indices.
3. Gain a better understanding of the laws of geometrical optics.

PEDAGOGICAL CONTENT DESCRIPTION

"Ray Tracer" is a series of programs which deal with reflection and refraction to investigate dispersion effects. Fourteen modes are available via the main menu:

1. Straight Interface (Air -- Glass)
2. Straight Interface (Glass -- Air)
3. Straight Interfaces (Air -- Glass -- Air)
4. Straight Interfaces (Any Media)
5. Thin Lens
6. Thick Lens
7. Thin Lens in Medium
8. Two Thin Lens
9. Compound Lens
10. Spherical Raindrop
11. Plane Mirror
12. Spherical Mirror
13. Single Refracting Surface
14. Manual.

The content is designed to expose students by means of a demonstration and/or game situation to the investigation of ray tracing as applied to reflection, refraction, and the dispersion effect. Of the fourteen modes, nine have preset conditions of media and interfaces and six are designed as demonstrations where the user must select the conditions required. No examples or explanations are included in the program. The user selects from the main menu the particular conditions (s)he wishes to view. In each case a starting point and target are given and the user must enter the angle at which the light ray is to be drawn. Each program draws individual rays from left to right, and mirrors and lenses can have various spherical surfaces from -400 to +400 curvature.

The accompanying Student's Guide provides brief program descriptions and outlines commands used in running the program. The Teacher's Guide provides greater detail on each program, includes demonstration suggestions, and outlines the computer program and expected output.

PEDAGOGICAL CONTENT EVALUATION

Content range is appropriate for the target audience, and depth can be user controlled. The program offers good sequencing with the beginning programs dealing with wave intersection of plane surfaces (air, glass, diamond, etc.) and progressing through simple lenses (thin and thick) to compound lenses and raindrop dispersion. While the program does not teach concepts, it does serve as an excellent demonstration tool to illustrate by visual example and application most facets of refraction, reflection, lenses and mirrors. A lack of computer instructions and examples makes reliance on the accompanying documentation mandatory.

INSTRUCTIONAL FORMAT DESCRIPTION

This program may be used by a student as a trial and error game or by a teacher as a special mode demonstration. Interaction is consistent and generally consists of mode selection, angle entry, and pressing of the RETURN key. Feedback consists of a "beep" if the target is hit or a written message if the input is incorrect (e.g. "Ray would miss interface. Try again.") The program is basically user controlled, with an option to exit available at all times.

INSTRUCTIONAL FORMAT EVALUATION

Most effective use of this program occurs when it is used in demonstration mode by the teacher to illustrate a wide variety of situations relating to reflection and refraction. The program suffers from limited or total lack of instruction as to the nature of expected input, thus the student game mode is often reduced to nothing more than haphazard guessing in the hope of hitting a target. Occasionally some illogical inputs are accepted which produce an endless loop of error messages and beeps from the speaker. (E.g. When an angle of 90 is entered.)

TECHNICAL CHARACTERISTICS DESCRIPTION

This program utilizes upper case standard text combined with high resolution graphics for ray depictions. For the two-ray option, red and blue colors are used for differentiation. Positive responses are rewarded with audio.

TECHNICAL CHARACTERISTICS EVALUATION

Displays are generally appropriate with large graphics suitable for demonstration. Occasionally some letter/number confusion exists (e.g. "S" and "5"). The ability to clear the screen without erasure of the topic under examination and the ability to move the source are useful features. Scrolling after the menu selection tends to clutter the screen. In some situations a timed scrolling of calculated angles is inappropriate.

Provided the documentation has been carefully read, the program is generally easy to use and is reliable. Only a small loss of effectiveness would occur if a color monitor was not used as only one option utilizes color distinction.

SUMMATION

As a classroom demonstration tool, this program represents an appropriate and interesting use of a computer to effectively simulate a variety of situations involving reflection and refraction. Use by individual students in game format is restricted primarily due to the lack of clear instructions on the disk.

STATUS

"Ray Tracer" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (1984) from Vernier Software at the address given at the beginning of the report. Purchasers are encouraged to make backup copies immediately upon purchase. This is possible because the programs are not copy protected. Should replacement be necessary by Vernier Software there would be a charge of $3.00 per disk.

RESISTANCE

DESCRIPTION

Title: Resistance
Series: Basic Concepts of Electricity Series (#3)
Author: George S. MacRae
Publisher: Merlan Scientific Ltd.
Source: 247 Armstrong Avenue, Georgetown, Ontario L7G 4X6
Subject: Science
Topics: Ohm's law, electrical resistance, resistance in circuits
Components: 2 disks and backups, teacher's guide (17p.)
System Requirements: Apple II+/IIe/IIc, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore PET/64

Version: 1983
Display Language: English
Cost: $95.00 (1985)
Tel. #: (416) 877-0171
Users: Grades 10 - 12

OBJECTIVES

After completing the three programs contained on this disk, students:

1. Will be able to determine the relationship between the current that flows through a wire and the potential difference across its ends.
2. Given two of the current passing through a conductor, the potential difference across its ends, and its resistance, will be able to calculate the third.
3. Will be able to list four factors which determine the resistance of a wire.
4. Given a network of resistors connected in a series, parallel or combination, will be able to determine the effective resistance of the network.

PEDAGOGICAL CONTENT DESCRIPTION

This disk contains three program:

OHM'S LAW - is a simulated experiment which explores the relationship between current flow through a wire and the potential drop across its ends. It is organized in such as way that results can be written up as a formal lab report.

ELECTRICAL RESISTANCE - The lesson portion of this program teaches the use of Ohm's Law in the form of R=V/I, has the user complete some exercises, and then proceeds to an example where the formula must be rearranged.

COMBINATIONS OF RESISTORS - explains resistors in series and parallel combinations, provides example questions, and contains student exercises pertaining to each.

Both programs two and three also contain a drill section designed to strengthen a student's understanding of the concept(s) under consideration.

A separate test disk contains multiple choice questions based upon the three lessons. Scores, diagnostic information and an optional printout are provided.

PEDAGOGICAL CONTENT EVALUATION

The presentation and development of each concept is logical and well ordered. Animation is used effectively to illustrate textual descriptions and clarify abstract concepts. Range, content and depth are appropriate for the target audience. While the programs are intended to be sequential, they can be accessed in any order.

A content error was noted: the data output of a very small current (e.g. 0.005) is paired with a potential drop of zero. While this may be true in practice, it is theoretically incorrect.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of menu selection, page turning, answering yes/no questions, keying single letter answers, or entering short words/phrases to complete a sentence. Questions within each lesson are presented in a fixed order, however review questions to test student understanding are randomized from a limited test bank. Correct answers receive positive textual feedback such as "Great Work" and close answers (e.g. entering a synonym for a word) receive a cautionary message such as "Hold on now". Feedback to incorrect answers informs the student the answer is wrong and the program usually allows a second attempt before presenting the correct answer. If a number of questions are answered incorrectly the program may go over the material again. Quantitative feedback is provided continually throughout the drills and encourages the student to get a perfect score.

The test diskette gives the user a choice of quantitative feedback after each question or at the end of the test. The user is also given the opportunity of reviewing the questions and is provided with an explanation of the concept that pertains to the questions answered in error. If a printer is available, a hardcopy printout of the student's score and diagnosis of areas of weakness can be made.

Sequence and rate are user controlled; amount is program controlled.

INSTRUCTIONAL FORMAT EVALUATION

The method of moving from the concrete to the abstract via example is instructionally sound. The program allows ample student interaction and the error checking routines for close but incorrect responses is very good. Occasionally the randomized textual positive responses are inappropriate--for example "Super" is likely not the best adjective to be used if the student needed five incorrect tries before arriving at the correct answer. Although questions within the tests are effectively randomized, the fixed order of questions within the lesson presentation limits potential reuse of the disk. The quantitative feedback and analysis of error provided during the post-test should enable students to recognize their weak areas and do specific corrective study on these areas. Unfortunately student scores are not saved to disk.

TECHNICAL CHARACTERISTICS DESCRIPTION

High resolution animated graphics are coupled with combination upper/lower case lettering.

TECHNICAL CHARACTERISTICS EVALUATION

Overall technical design is very good, however the inability to exit a drill until all ten questions are completed may be considered a drawback. The option of obtaining hard copy results of the post-test along with an analysis of areas of weakness is very useful. Displays are well formatted and the use of animation effectively contributes to student understanding. The fact that each lesson loads totally into memory upon initial booting is a program plus.

An inconsistency was noted in the circuit diagrams in that standard circuit diagram symbols are used for the cell or power source but they are not used for circuit resistors.

IMPLEMENTATIONAL SUPPORT DESCRIPTION

Teacher documentation in the form of a 22 page 3-ring binder provides operating instructions, outlines program objectives, and provides an overview of the disk contents.

IMPLEMENTATIONAL SUPPORT EVALUATION

The program is easy to implement in a classroom and students should be able to work independently with little or no teacher intervention.

Two errors were noted in the documentation:

1. Ohm's Law in formula form is stated as V=I/R rather that V=IR.
2. User's are informed that two consecutive answers will cause the program to advance, however in some places five corrected answers are required.

SUMMATION

The graphics used in this program greatly enhance student understanding of rather abstract concepts. Helpful feedback, printed quantitative analysis of student learning, and branching for review all contribute to the instructional strength of this package.

STATUS

"Resistance" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $95.00 (1985) from Merlan Scientific at the address given at the beginning of the report. This product is part of a series titled "Basic Concepts of Electricity Series" which may be purchased for $295.00 (1985). All four components ("Basic Concepts", "Introduction to Circuits", "Resistance" and "Electrical Energy") are undergoing final evaluation and their assessments may be found elsewhere in this report.

Defective diskettes will be replaced without charge within a one year warranty period. Diskettes which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

TRANSVERSE WAVES

DESCRIPTION

Title: Transverse Waves
Author: None cited
Publisher: Heinemann Computers in Education
Source: c/o Gage Publishing Ltd., 164 Commander Blvd, Agincourt, ON M1S 3C7
Subject: Science
Topics: Transverse waves - interference, reflection and beats
Components: 1 disk and backup, manual (14p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Display Language: English
Cost: $85.00 (1985)
Tel. #: (416) 293-8141
Users : Grades 9 - 12

OBJECTIVES

Students will be able to:

1. Understand transverse waves in terms of discrete particles.
2. Relate wavelength, frequency and velocity of transverse waves.
3. Explain interference and beats.
4. Describe reflection of a wave from a rigid boundary.

PEDAGOGICAL CONTENT DESCRIPTION

This program is designed as a simulation of a transverse wave where the wave properties can be controlled by the user. Display options allow the user to vary amplitude, wavelength, velocity, display speed and number of particles of the medium shown. As well, one, two or the sum of two waves can be displayed with or without axes. The program allows the user to explore either the effects of interference or reflection (including interference of waves moving in opposite directions) or beats (complex regular vibrations).

PEDAGOGICAL CONTENT EVALUATION

Since this program does not include a tutorial or any definition of terms, prior classroom teaching of the concepts of oscillation, amplitude, frequency, periodic time, and velocity is mandatory. The program is designed as a user controlled simulation and as such the range, depth and sequence are flexible and to a large extent controlled by the user. The illustrations and control of parameters are excellent with unlimited experimentation possible. The program could be used effectively as a teacher controlled demonstration at several levels of difficulty.

Since this program is produced in England, some connotative differences are evident. For example, this program uses the term "beats" to describe all "regular complex vibrations" whereas we limit it to interference of sound waves (longitudinal waves). Also the section on reflection does not deal with reflection in terms of the angle of incidence equalling the angle of reflection, but rather illustrates the interference of waves moving in opposite directions.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of selecting menu choices, entering wave length parameters, and setting display modes. ESCAPE is used to switch to the parameter screen or to the main menu and the space bar is used to go to the graphic display or to stop and restart the wave motion. Feedback consists of a graphic display using the student selected parameters. If a student's input is outside the acceptable range, a beep and message are used to indicate an invalid entry. The user has total control of rate, sequence, and amount.

INSTRUCTIONAL FORMAT EVALUATION

Assuming that students have the prerequisite knowledge of the concepts of amplitude, frequency, periodic time and velocity (as identified in the user's manual), this program provides an excellent demonstration of concepts which are difficult to experimentally produce. A prime advantage of the format is that the topic of transverse waves can be investigated at several different levels from an introduction to the nature of a transverse wave to more complex properties such as beats. The program by its nature is not meant to be a complete instructional unit but rather to be a supplement to classroom instruction.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program uses high resolution graphics and animations for displays of wave motion. Transverse waves are presented on a screen divided into three sections. The top two portions of the screen display two different transverse waves while the larger bottom section is used to display the sum of the two waves. A horizontal axis for all three waves may be displayed as a user option. The wave motion can be frozen at any point for further study.

Color is not used in the program. Sound consists of beeps to indicate that a user's input is incompatible with a predetermined range of responses. Combination upper/lower case text in presented in standard size.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are clear and well formatted with excellent flexibility in choosing the amount of detail and the speed of the display. The ability to enter only the first letter or the first two characters of a parameter name makes the program fast and easy to use. The ability to change the phase relationship "on the go" is a very useful and effective part of this program.

SUMMATION

When used in conjunction with classroom instruction and regular laboratory activities, this program is an excellent visual aid to explain the concept of transverse waves. It can be effectively used by the teacher as a demonstration tool; by individual students to explore the concepts of interference, reflection, or beats; or, because of the flexibility it allows, it could be particularly useful as an enrichment tool for the above average physics student. Unfortunately, the price is somewhat high.

STATUS

"Transverse Waves" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $85.00 (1985) from Gage at the address given at the beginning of the report. Damaged diskettes may be replaced free of charge within a 90 day warranty period. Subsequently, damaged disks may be replaced for $52.95.

WATER POLLUTION

DESCRIPTION

Title: Water Pollution
Author: None cited
Publisher: Educational Materials and Equipment Co.
Source: P.O. Box 17, Pelham, N.Y. 10803
Subject: Science
Topics: Water pollution
Components: 1 disk, student lab booklet (4p.) (25 copies), user's guide (6p.)
System Requirements: Apple II+ only, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): TRS-80 Model I/III

Version: 1982
Display Language: English
Cost: $29.50 U.S. (1984)
Tel. #: (914) 576-1121
Users : Junior High +

OBJECTIVES

This program is designed to help students to:

1. Understand the variables that improve/degrade water quality.
2. Determine the impact of water pollution on aquatic populations.
3. Predict the effects of manipulating one or more variables.
4. Improve data interpretation, problem-solving skills and graphing skills.
5. Evaluate hypotheses in light of experimental results.
6. Design experiments and plan a research project.

PEDAGOGICAL CONTENT DESCRIPTION

"Water Pollution" is an interactive computer simulation consisting of three programs:

INTRODUCTION - This tutorial section reviews the basic concepts of water pollution (physical properties of water, factors affecting dissolved oxygen levels, types of water pollution, fish kill, biochemical oxygen demand, primary and secondary treatment of wastes, etc.)

EXPERIMENT MODE - This section allows the student to perform water pollution experiments. The student may alter the physical characteristics of a body of water (size, turbulence, temperature), type of waste (sewage, industrial), dumping rate, treatment type (none, primary, secondary), and the number of days the simulated experiment is to run.

QUIZ - The final section of the disk includes a ten question multiple choice quiz.

The accompanying student booklet poses questions to test knowledge, includes five fixed activities to do in the experiment mode, and suggests two advanced activities for further study.

PEDAGOGICAL CONTENT EVALUATION

The range and sequence of topics is appropriate for high school biology. Program content is accurate; however, depth of coverage is insufficient and often results in over-simplification. (E.g. Water pollution is equated with oxygen depletion and other effects of water pollution are not discussed; anaerobic decomposition is tested but not taught, etc.) Within these limitations, however, this disk does provide a basic introduction to the effects of oxygen concentration in fresh water.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of pressing the arrow keys for page turning or letter entries for responses. Amount and sequence are both program controlled (i.e. a student must work through an entire program or exit--(s)he cannot enter at any specific point); rate is user controlled.

Positive feedback consists of the word "correct" followed by an explanation of why the answer is correct when appropriate. On an incorrect response the user is told to "try again". If the second choice is also incorrect, the correct answer is given and an accompanying explanation is given where appropriate.

INSTRUCTIONAL FORMAT EVALUATION

The tutorial portion of this program consists of reading concepts as they are presented. The strength of this program lies in the experimental mode where, along with the activities suggested in the support materials, the student should gain a good appreciation of the effect of different variables on water's ability to support animal life. The options for experimental results to be shown as a table, graph or print-out provides different perspectives on the results.

The quiz, although restricted to 10 multiple choice questions, covers the concepts of the program (except anaerobic breakdown) as well as allows for a limited application of knowledge gained from the program. The explanation statements which accompany correct answers reinforce student knowledge.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program effectively uses both color and graphics. Sound is used to show oxygen consumption (by Pac-man).

TECHNICAL CHARACTERISTICS EVALUATION

Technical design is generally effective although the large lettering used in the displays combined with the overuse of displays may be more appropriate for an elementary audience. Slow graphic production tends to detract from the information that is presented.

SUMMATION

Although the tutorial section of this disk is primarily a page turner and the quiz is limited to only ten questions, the experimental mode allows an interesting test of the effects of different variables on a water's ability to support fish life.

STATUS

"Water Pollution" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.50 U.S. (1984) from Educational Materials & Equipment Company at the address given at the beginning of the report. Any non-functioning disk will be replaced at no charge as long as the publisher is assured that the disk rather than the hardware is the source of the problem. This warranty applies as long as the program is published.

WAVE ADDITION II

DESCRIPTION

Title: Wave Addition II
Author: David Vernier
Publisher: Vernier Software
Source: 2920 SW 89 Street, Portland, OR 97225
Subject: Science
Topics: Superposition of waves
Components: 1 disk, manual (18p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, color monitor preferred
Other Formats Available (not evaluated): Available in Apple format only.

Version: 1983
Display Language: English
Cost: $24.95 U.S. (1984)
Tel. #: (503) 297-5317
Users : High School

OBJECTIVES

The program is designed to demonstrate how waves add together according to the superposition principle.

PEDAGOGICAL CONTENT DESCRIPTION

This program consists of ten modes incorporating demonstrations, tutorials, or user interactive programs designed to illustrate how waves add together according to the superposition principle. Beats, constructive and destructive interference, formation of musical notes and Fourier synthesis are covered.

The modes offered are:

0. General instruction
1. Demonstration of Addition of Two Waves
2. Addition of Two Waves
3. Demonstrations of Beats
4. Addition of Four Waves
5. Explanation of Fourier Synthesis
6. Demonstration: Synthesis of a Square Wave
7. Demonstration: Synthesis of a Sawtooth Wave
8. Demonstration: Synthesis of a Triangular Wave
9. Fourier Synthesis of up to Nine Waves.

The general instruction (#0) provides abbreviated instructions for using the program. Some of the remaining programs are demonstrations in which the computer adds pre-programmed waves in order to demonstrate a specific wave phenomenon. In other modes, the user selects the waves to be added. After the waves to be added are selected, each wave is drawn and then the results of the superposition is displayed.

The manual defines terminology, presents a brief description of each mode, outlines disk operation, outlines prerequisite knowledge required, suggests possible program modifications and provides information on the program listing.

PEDAGOGICAL CONTENT EVALUATION

The content range is appropriate for the target audience and is well sequenced from simple addition of two waves to complex Fourier syntheses. This program is essentially designed as a demonstration tool using graphic simulations to illustrate basic wave characteristics (frequency, amplitude, wave length, phase angle, etc.); however, the explanation of functions performed by each section and the number of options within each section help to increase the versatility of the program. These enable the program to operate very smoothly and, with some prior instruction, it can stand on its own.

INSTRUCTIONAL FORMAT DESCRIPTION

A brief introduction explains each mode; students then select the program they wish to use from the main menu. The demonstration/tutorial programs only require pressing the RETURN key to activate page turning; the interactive programs require numerical input of the operating parameters.

At the end of a run, the user may elect to redraw the same wave addition diagram on the same scale or redraw it on an expanded horizontal scale. When selecting a mode, the user may choose to control the pace of the displays or may choose to cause the summation of waves added so far to be displayed on a separate graphics screen.

Since this program consists solely of demonstrations, traditional questioning techniques and feedback are absent. The result of any input is either a new page of text or the graphing of a simulation for which the parameters have been specified.

INSTRUCTIONAL FORMAT EVALUATION

The overall instructional technique is effective for classroom demonstration/discussion and also for enrichment experiences for students wishing to experiment with Fourier syntheses.

TECHNICAL CHARACTERISTICS DESCRIPTION

This program utilizes upper case standard text combined with high resolution graphics for wave depictions with a maximum of four colors used for differentiation. The introduction uses upper and lower case high resolution text.

TECHNICAL CHARACTERISTICS EVALUATION

Input methods are consistent, but further information on how to enter the data and the size of the desired parameters might be beneficial. While the program can be adequately run on a monochrome monitor, use of a color monitor does add clarity when several waves are plotted. Still, the screen can get cluttered and thus confusing when a large number of waves are drawn.

SUMMATION

This program makes effective use of the computer to generate graphical demonstrations of wave addition and superposition to provide a conceptual basis of study of the many standard, observable properties of waves.

STATUS

"Wave Addition II" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $24.95 U.S. (1984) from Vernier Software at the address given at the beginning of the report. Purchasers are encouraged to make backup copies immediately upon purchase. This is possible because the programs are not copy protected. Should replacement be necessary by Vernier Software there would be a charge of $3.00 per disk.

WAVE DEMONSTRATIONS

DESCRIPTION

Title: Wave Demonstrations
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science
Topics: Periodic transverse waves, reflection, interference and standing waves on a string
Components: 1 disk and backup, user's guide (1p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Commodore Pet & 64

Version: 1983
Display Language: English
Cost: $32.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

OBJECTIVES

The program is designed to provide a visual aid for the instructor in demonstrating wave behaviour using transverse waves.

PEDAGOGICAL CONTENT DESCRIPTION

The program uses transverse waves to demonstrate the following properties:

1. Constructive interference
2. Destructive interference
3. A wave train
4. Reflection of a wave
5. A standing wave with up to 6 patterns.

The teacher selects the concept to be displayed from a menu and the program then shows the appropriate waveform. The user may freeze the frame, continue with the display or repeat as desired. In the standing wave demonstration mode, the user has the additional option of selecting the number of mode "loops' to be displayed and whether or not (s)he desires the display to be shaded to show the static standing wave.

PEDAGOGICAL CONTENT EVALUATION

The content is clear, accurate and concise but is limited in the scope presented.

INSTRUCTIONAL FORMAT EVALUATION

The program is designed as a demonstration and as a result there is no instructional design.

TECHNICAL CHARACTERISTICS DESCRIPTION

Animated graphics and text are both presented in high resolution mode.

TECHNICAL CHARACTERISTICS EVALUATION

The displays demonstrate excellent use of graphics.

SUMMATION

As a demonstration tool, the graphic displays are excellent although somewhat limited in scope.

The disk does not have an instructional component and, as such, it would not generally fall within our search area and as a result it would not normally be considered. However, the disk is part of a series which is instructional and is also quite good; therefore, the demonstration disk has also been evaluated.

STATUS

"Wave Demonstrations" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $32.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150.00. It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

WAVES IN A LINEAR MEDIUM: INTRODUCTION

DESCRIPTION

Title: Waves in a Linear Medium: Introduction
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science

Version: 1983
Display Language: English
Cost: $41.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

Topics: Nature of wave pulses in a medium, changes in size and shape of pulses, speed of pulse, reflection
Components: 1 disk and backup, user's guide (3p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor, stop watch
Other Formats Available (not evaluated): Commodore Pet & 64

OBJECTIVES

The student will be able to:

1. State the meaning of the term 'wave'.
2. Describe behaviour changes of a medium as a wave pulse passes through it.
3. Describe changes in size and shape of a pulse as it travels along an 'ideal' spring.
4. Predict the relative speed of a pulse travelling in a spring under different tension and densities.
5. Describe the reflection occurring when a pulse is reflected in a medium from a fixed end and from a free end.

PEDAGOGICAL CONTENT DESCRIPTION

This module contains 3 lessons on waves which the user selects from a menu. Lessons consist of animated graphic displays, descriptions of the events and questions about the concept. The user is occasionally directed to observe a specific item for which questions are asked. For certain items the user is required to use a stop watch to time an event to the nearest 0.2 secs. Each lesson closes with a review of the major terms and objectives of the lesson.

PEDAGOGICAL CONTENT EVALUATION

Each objective has been carefully sequenced and is adequately demonstrated before questions are presented. The range, sequence and depth are all good.

INSTRUCTIONAL FORMAT DESCRIPTION

Using a tutorial type mode, the user is required to push the space bar to advance frames, enter times for events as obtained from a stop watch, respond by entering words to complete a phrase or select the appropriate letter for a multiple choice question. Questions are presented in a fixed sequence.

Positive feedback consists of the presentation of a variety of expressions. In the event of a timing error, the student is required to repeat the timing. The program will provide the answer after a second error.

INSTRUCTIONAL FORMAT EVALUATION

The amount of student interaction is sufficient and is effective in testing the student's grasp of the items under study.

In general the questioning technique is satisfactory but when the user is required to complete an expression, only the exact phrase expected by the program is accepted. Some questions are based on previous screens which the user can not review. Also the fixed order of the questions limits reusability somewhat.

Quantitative feedback which remains at the end of the last lesson (review) would be advantageous.

TECHNICAL CHARACTERISTICS DESCRIPTION

Animated graphics are used to demonstrate the concepts. A high resolution generated character set is employed to present text.

TECHNICAL CHARACTERISTICS EVALUATION

The technical aspects of the program are very good and the program is exceptionally easy to operate. One minor flaw in the graphics presentation of the wave pulses is the apparent movement of the dots (coils) in the direction of wave propagation rather than simply oscillating perpendicularly to the direction of wave motion.

SUMMATION

The program is not intended to replace 'hands on' work in the laboratory. However, the lessons are well done and will meet their objectives of providing an introduction to waves in a linear medium.

Strengths of the lessons are:

1. The concepts are well developed and are sequenced in a logical order.
2. The user is required to interact frequently and in different modes.
3. The animated graphics contribute greatly to the clarity of the concept being presented.

Weaknesses are minor only and do not detract from the overall effectiveness of the package.

STATUS

"Waves in a Linear Medium: Introduction" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $41.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150.00. It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

WAVES IN A LINEAR MEDIUM: SUPERPOSITION

DESCRIPTION

Title: Waves in a Linear Medium: Superposition
Series: Waves and Vibrations
Author: G. MacRae
Publisher: Merlan Scientific
Source: 247 Armstrong Ave., Georgetown, ON L7G 4X6
Subject: Science
Topics: Constructive and destructive interference of pulses, superposition principle
Components: 1 disk and backup, user's guide (1p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor, game paddles optional
Other Formats Available (not evaluated): Commodore Pet & 64

Version: 1983
Display Language: English
Cost: $37.00 (1985)
Tel. #: (416) 877 - 0171
Users : High School

OBJECTIVES

The student will be able to:

1. Describe what happens to wave pulses after they interfere.
2. Categorize any resultant interference as constructive or destructive, given a pair of pulses.
3. Describe destructive interference caused by symmetrical pulses and non-symmetrical pulses.
4. Use the principle of superposition to construct the resultant pulse given a pair of overlapping pulses.

PEDAGOGICAL CONTENT DESCRIPTION

This module contains 2 lessons on waves which the user selects from a menu. Lessons consist of the presentation of animated graphic displays of pulses traveling along a spring from opposite ends to form constructive and destructive interference. Both symmetrical and asymmetrical pulses are used. The student must respond to the graphic situations by answering questions on the display, entering values read from a graph or moving a flashing cursor to the desired graph location by the use of game paddles.

PEDAGOGICAL CONTENT EVALUATION

The range, sequence and depth of the topics are appropriate for the target audience. Content is accurate but the use of the term "identical symmetrical pulses" may cause confusion. Using a very specific case for non-symmetrical pulses may give the student the impression there will always be a stationary midpoint, which is not always the case.

INSTRUCTIONAL FORMAT DESCRIPTION

Using a tutorial type mode, the user is required to push the space bar to advance frames, respond to questions by entering true, false or appropriate phrases. In working with graphs, the user may use game paddles to enter locations on a graph or may enter the necessary numerical values from the keyboard. Questions are presented in a fixed sequence.

Positive feedback consists of the presentation of a variety of expressions. Incorrect answers usually result in the demonstration of the action again and re-presentation of the question. Students who continue to make mistakes are given the correct answer and the reasoning.

INSTRUCTIONAL FORMAT EVALUATION

The amount of student interaction is sufficient and is effective in testing the student's grasp of the items under study.

One minor weakness is that students may make errors continually in order to receive the correct answer. Recycling the student through the material is not practiced.

TECHNICAL CHARACTERISTICS DESCRIPTION

Animated graphics are used to demonstrate the concepts. A high resolution generated character set is employed to present text.

TECHNICAL CHARACTERISTICS EVALUATION

The technical aspects of the program are very good and the program is easy to operate. The animated displays illustrating wave behaviour contribute greatly to the clarity of the concept being presented.

SUMMATION

In general the use of animation to present various concepts about waves and their behaviour is very well done and is a good use of the computer medium. The principle of superposition as presented by the program is very well done. However, the illusion created by apparent movement of particles in the medium in the direction of the wave form does distract from a realistic presentation.

STATUS

"Waves in a Linear Medium: Superposition" is undergoing final evaluation and currently has no authorized status.

PURCHASE INFORMATION

This disk is part of a series and may be purchased for $37.00 (1985) from Merlan Scientific Ltd. at the address given at the beginning of the report. The entire series may be purchased for $150.00. It consists of 6 modules: Periodic Motion; Waves in a Linear Medium - Introduction; Waves in a Linear Medium - Superposition; Periodic Waves - Basic Concepts; Longitudinal Wave Demonstrator; and Wave Demonstrations. All of these have advanced to third stage evaluation and reports on them are contained in this document.

Defective diskettes will be replaced without charge within a one year warranty period. Disks which become inoperable through normal use will be replaced for $10.00 within a one year warranty period.

In Alberta, the product may be purchased from Edupro Software (see page v. of the preface). Contact the company directly for price and warranty information.

WRITING CHEMICAL FORMULAS

DESCRIPTION

Title: Writing Chemical Formulas
Author: Don Ross
Publisher: Microcomputer Workshops
Source: 225 Westchester Ave, Port Chester, New York 10573
Subject: Science
Topics: Chemical formulae
Components: 1 diskette, guide (4p.)
System Requirements: Apple II+/IIe, 48K, 1 disk drive, monochrome monitor
Other Formats Available (not evaluated): Available in Apple format only

Version: 1983
Display Language: English
Cost: $29.95 U.S. (1984)
Tel. #: (914) 937-5440
Users : Grades 7-12

OBJECTIVES

To give a student practice in writing chemical formulas from a possible base of more than 120 different compounds that are randomly chosen.

PEDAGOGICAL CONTENT DESCRIPTION

The program covers the writing of chemical formulae for ionic substances given the name of the substance. Eleven metals, seven simple nonmetals and four complex ions are used to generate problems. Multi-valence metals and hydrates aren't included. The user may access a remedial branch which develops the formula for each problem or a help page which lists the ions used in the program along with their oxidation numbers. After each problem, the user is informed about the number of errors made and is given the option of trying another problem. When the user elects to exit, the total number of errors and average number of errors per trial is shown.

PEDAGOGICAL CONTENT EVALUATION

The depth of the treatment, considering the material covered, is appropriate for the upper end of the target audience but requires some prerequisite knowledge about the nature of ions, oxidation numbers and the use of brackets with complex ions.

The range of the program is insufficient to cover the stated objective. The lack of coverage of multi-valenced metals, hydrates, acid names and a variety of molecular compounds makes the program more appropriate to a junior science course. At this level, the 'senior high depth' may be a disadvantage.

The content is quite accurate with the exception of the guidebook referring to ions and complex ions as elements and gold being shown with a +1 charge on the oxidation table.

INSTRUCTIONAL FORMAT DESCRIPTION

User interaction consists of the entry of numerical (oxidation numbers, charge balancing) and alphabetic (ion symbols, compound formulas) responses to questions as well as the pressing of the return key for page turning. The ESCAPE key is used to enter lower case letters for the chemical symbols. The user has an optional instructional branch (8 pages) at the beginning of the program and remedial branches (approximately 10 pages) for each problem. The user chooses whether or not (s)he will do another problem at the end of each question.

The problems are chosen randomly from a limited data bank of 11 metals, 7 simple non-metals and 4 complex ions. The remedial branch poses questions in a programmed order to elicit the correct formula for the compound being considered.

Positive feedback consists of a standard response followed by one of ten randomly chosen statements. Negative feedback asks the student if (s)he needs help which, if answered affirmatively, enters the user into the remedial branch. Positive feedback within that branch consists of short positive statements while negative feedback provides the correct formula. In either case, a summary table of information building towards the correct formula is filled in. At the end of the branch, the total number of errors made is given along with a positively stated evaluation. If the user elects not to do the remedial branch after getting a question wrong, the original question is repeated. Errors result in a second offer to present the remedial branch. Quantitative feedback at the end of the program describes the number of problems tried, the total number of errors and the average number of errors per problem.

INSTRUCTIONAL FORMAT EVALUATION

The program has an effective drill and practice format. The remedial branch, the procedure of maintaining the "help" information on the screen for all problems, the evaluation of answers with the answer being maintained on the screen, the encouraging feedback and the repetition of questions which were answered incorrectly are all strong positive features.

The program has some weaknesses however. Questions are not effectively randomized and the same question may appear twice in a row even if it was answered correctly. The remedial branch cannot be exited quickly once the answer is realized and a new question cannot be obtained until the present one is answered.

TECHNICAL CHARACTERISTICS DESCRIPTION

There is no use of color or sound in the program. Graphics are used for the numerical subscripts, lower case letters and for the remedial chart lines.

TECHNICAL CHARACTERISTICS EVALUATION

The displays are well spaced and appropriate. Upper and lower case letters along with subscript numbers (automatically subscripted) accurately simulate chemical formulas. The remedial branch display is always on the screen so that users will be reminded of the steps involved in finding the formula. The chemical symbols and oxidation numbers are available at all appropriate times. Finally, the program is simple and easy to use.

Negatively, the program allows letter and numerical input where only one or the other is appropriate. The keys are not frozen for inappropriate inputs and the program will bomb through CTRL-C or CTRL-RESET. Chemically, + and - are allowable simplifications whereas the program insists upon +1 and -1 for oxidation values. Sometimes the program can be frustrating due to the slow development of the remedial branch. Grade ten students, while they found the program very easy to do, also found it to be non-motivational.

SUMMATION

The major strengths of the program include accurate chemical notation, immediate feedback to all responses and the availability of a help screen and a remedial branch. The remedial chart is always on the screen to remind the user of the steps in finding the correct chemical formula.

The program has content weaknesses in that multivalent ions, many complex ions, hydrated compounds, acids and molecular substances are not attempted in the program. This makes it too limited to be of great value to senior high courses. Also, users who refuse to take the rather long remedial branch cannot proceed to another problem and no diagnosis of errors is provided.

STATUS

"Writing Chemical Formulas" is undergoing final evaluation (at the junior high school level only) and currently has no authorized status.

PURCHASE INFORMATION

This product may be purchased for $29.95 U.S. (1984) from Microcomputer Workshops at the address given at the beginning of the report. A backup may be purchased for an additional $5.00 U.S. The company provides a life time guarantee against defective diskettes and will replace worn out diskettes without charge at any time.

In Alberta, Microcomputer Workshop products are carried by Edupro Software. Contact the company directly for price and warranty information (see page v. of the preface).

SCIENCE TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
ALTERNA TECHNICAL	ANIMAL CHARACTERS	1984.0	41
ALTERNA TECHNICAL	CELL	0.0	41
ALTERNA TECHNICAL	CELL DIVISION	0.0	41
ALTERNA TECHNICAL	DOING SCIENCE	1984.0	41
ALTERNA TECHNICAL	ELECTRIC LOOPS	1984.0	41
ALTERNA TECHNICAL	WHAT IS SCIENCE	1984.0	41
ALTERNA TECHNICAL	WHEN THE WIND BLOWS	1984.0	41
AQUARIUS	CHEMISTRY SIM. SET 1	0.0	60
AQUARIUS	CHEMISTRY SIM. SET 2	1981.0	41
AQUARIUS	STREAMS & RIVERS	1982.0	41
AQUARIUS	THE OCEANS	1982.0	41
AQUARIUS	THE PLANETS	1982.0	41
AQUARIUS	THE SKIES ABOVE/THE WATERS BELOW (4 PART SERIES)	1982.0	41
AQUARIUS	THE STARS	1982.0	41
AVANT GARDE CREATIONS	ALIVENESS LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	CONDITIONING LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	CREATIVITY LIFE DYNAMIC PACKAGE	0.0	50
AVANT GARDE CREATIONS	ENVIRONMENT LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	GAS LAWS	0.0	40
AVANT GARDE CREATIONS	INTRO. TO WEATHER CHARTS	0.0	40
AVANT GARDE CREATIONS	LIFE DYNAMIC TRANSFORMATION	0.0	50
AVANT GARDE CREATIONS	MEANING LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	MECHANICS & MOTION	0.0	40
AVANT GARDE CREATIONS	NORMALCY LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	PHYSICAL LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	RELATIONSHIP LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	RESPONSIBILITY LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	SEXUALITY LIFE DYNAMIC	0.0	50
AVANT GARDE CREATIONS	THE DIGESTIVE SYSTEM	1981.0	41
AVANT GARDE CREATIONS	THE HEART	1981.0	41
AVANT GARDE CREATIONS	ZES COURSEWARE	1981.0	41
BIOSOURCE SOFTWARE	NEUROMUSCULAR CONCEPTS	1984.0	41
BIOSOURCE SOFTWARE	SKELETAL MUSCLE ANATOMY & PHYSIOLOGY	1984.0	41
BLS	BASIC CHEMISTRY	0.0	50
BLS	CARDIOVASCULAR SYSTEM	0.0	50
BLS	CELL	0.0	50
BLS	CHEMICAL BASIS OF BIOLOGY	0.0	50
BLS	DIGESTIVE SYSTEM	0.0	50
BLS	ELEM. BIOLOGY	0.0	40
BLS	ELEM. EARTH SCIENCE	0.0	50
BLS	ENDOCRINE SYSTEM	0.0	50
BLS	FIRST SEMESTER ELEMENTS OF PHYSICS	0.0	50
BLS	INTRO. TO MICROBIOLOGY	0.0	50
BLS	LYMPHATIC SYSTEM	0.0	50
BLS	MUSCULAR SYSTEM	0.0	50
BLS	NERVOUS SYSTEM	0.0	50
BLS	NUTRITION METABOLISM FLUID & ELECROLYTE BALANCE	0.0	50
BLS	PERCEPTION CONCEPTS IN SIGHT & HEARING	0.0	50
BLS	REPRODUCTION IN HUMANS	0.0	50

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BLS	REPRODUCTIVE SYSTEM	0.0	50
BLS	RESPIRATORY SYSTEM	0.0	50
BLS	SECOND SEMESTER ELEMENTS OF PHYSICS	0.0	50
BLS	SKELETAL SYSTEM	0.0	50
BLS	SKIN	0.0	50
BLS	SPECIAL SENSES	0.0	50
BLS	URINARY SYSTEM	0.0	50
BRAIN BANK	HUMAN BODY AN OVERVIEW	1982.0	42
CDS SOFTWARE	DINOSAUR DIG	0.0	40
CEEDE	HUMAN BODY PART 1	0.0	60
CEEDE	SKELETAL SYSTEM	0.0	60
CENTRE FOR SCIENCE	ECO-PARADISE	1984.0	41
CLASSROOM COURSEWARE COMPANY	ATOMS	0.0	60
CLASSROOM COURSEWARE COMPANY	GENES	0.0	60
CLASSROOM COURSEWARE COMPANY	MEASURE	0.0	60
CLASSROOM COURSEWARE COMPANY	METRIC ENGLISH	0.0	60
CLASSROOM COURSEWARE COMPANY	PLANETS	0.0	60
CLASSROOM COURSEWARE COMPANY	THERMOMETER	0.0	60
COMPRESS	ALCOHOLS	1980.0	70
COMPRESS	ALDEHYDES & KETONES	1980.0	70
COMPRESS	ALKANES & ALKENES	1980.0	70
COMPRESS	ARENES	1980.0	70
COMPRESS	ATOMIC WEIGHTS	1983.0	42
COMPRESS	BIOBITS (8 PART SERIES)	1982.0	41
COMPRESS	BIOBITS 1 LIFE	1982.0	41
COMPRESS	BIOBITS 2 MAGIC FLAG	1982.0	41
COMPRESS	BIOBITS 3 GROWTH	1982.0	70
COMPRESS	BIOBITS 4 INTERACTIONS	1982.0	42
COMPRESS	BIOBITS 5 PROFILES IN POPULATION	1982.0	70
COMPRESS	BIOBITS 6 EVOLUTION	1982.0	42
COMPRESS	BIOBITS 7 NUCLEIC ACID CONNECTION	1982.0	42
COMPRESS	BIOBITS 8 ANALYTICS	1982.0	41
COMPRESS	CARBOXYLIC ACIDS	1980.0	70
COMPRESS	CHEMAZE	1983.0	70
COMPRESS	CHEMICAL ELEMENTS	1983.0	42
COMPRESS	CHEMICAL FORMULAS & EQUATIONS(BALANCING EQUATIONS)	1983.0	42
COMPRESS	CHEMRAIN	1980.0	41
COMPRESS	INORGANIC NOMENCLATURE	1983.0	42
COMPRESS	INTRODUCTION TO ORGANIC CHEMISTRY (8 PART SERIES)	1980.0	42
COMPRESS	INTRODUCTION TO POLYERS	1982.0	42
COMPRESS	IR & NMR SPECTROSCOPY	1980.0	70
COMPRESS	KINETICS OF GROWTH OF STEP GROWTH POLYMERIZATION	1982.0	70
COMPRESS	MENDELIAN GENETICS: A PROBLEM SOLVING APPROACH	1982.0	42
COMPRESS	MOLECULAR WEIGHT OF POLYMERS	1982.0	70
COMPRESS	NOMENCLATURE OF POLYMERS	1982.0	42
COMPRESS	ORGANIC QUALITATIVE ANALYSIS	1981.0	42
COMPRESS	PERCENT COMPOSITION	1983.0	42
COMPRESS	POLYMER CHEMISTRY	1982.0	42
COMPRESS	POPULATION GROWTH: A PROBLEM SOLVING APPROACH	1982.0	42
COMPRESS	QUIZ ON POLYMER CHEMISTRY	1982.0	70

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COMPRESS	RADICAL INITIATION OF CHAIN GROWTH POLYMERIZATION	1982.0	70
COMPRESS	STRUCTURE OF POLYMERS	1982.0	42
COMPRESS	SUBSTITUTION REACTIONS	1980.0	41
CONDOR COMPUTING	BALANCING MOLECULES	0.0	50
CONDOR COMPUTING	DENSITY LAB	0.0	50
CONDOR COMPUTING	ELEMENTS & SYMBOLS	0.0	50
CONDUIT	ACID BASE TITRATIONS	1983.0	41
CONDUIT	BAFFLES	1983.0	41
CONDUIT	CAT LAB	1982.0	41
CONDUIT	COEXIST	1980.0	43
CONDUIT	COMPUTERS IN THE BIOLOGY CURRICULUM	0.0	50
CONDUIT	ECOLOGICAL MODELING	1980.0	43
CONDUIT	ENZKIN	1979.0	43
CONDUIT	EVOLUT	1980.0	42
CONDUIT	GROUP VELOCITY	1981.0	70
CONDUIT	IDGAME	0.0	70
CONDUIT	INTERP	1980.0	70
CONDUIT	INTRODUCTORY MECHANICS FOR APPLE	1981.0	70
CONDUIT	LINKOVER	1980.0	42
CONDUIT	NEWTON	0.0	40
CONDUIT	OSMOTIC PRESSURE	0.0	70
CONDUIT	RKINET	1980.0	70
CONDUIT	SCATTER	0.0	40
CONDUIT	TRIBBLES	1980.0	42
CONTROL DATA CORPORATION	PHYSICS ELEMENTARY MECHANICS	1982.0	41
CROSS EDUCATIONAL SOFTWARE	AQUARIUM	1981.0	41
CROSS EDUCATIONAL SOFTWARE	ATOMIC PHYSICS	0.0	41
CROSS EDUCATIONAL SOFTWARE	CIRCULAR MOTION	0.0	41
CROSS EDUCATIONAL SOFTWARE	CONSERVATION LAWS	0.0	41
CROSS EDUCATIONAL SOFTWARE	ELECTRICITY & MAGNETISM	0.0	41
CROSS EDUCATIONAL SOFTWARE	MOTION	0.0	40
CROSS EDUCATIONAL SOFTWARE	OPTICS	1981.0	42
CROSS EDUCATIONAL SOFTWARE	SOLAR SYSTEM ASTRONOMY	0.0	41
CROSS EDUCATIONAL SOFTWARE	STATICS	0.0	41
CROSS EDUCATIONAL SOFTWARE	STELLAR ASTRONOMY	0.0	40
CROSS EDUCATIONAL SOFTWARE	THERMODYNAMICS	0.0	41
CROSS EDUCATIONAL SOFTWARE	VECTORS & GRAPHING	0.0	40
CYGNUS SOFTWARE	CHARACTERISTICS OF A SCIENTIST	1933.0	42
DATATECH SOFTWARE SYSTEMS	LAB BALANCE TUTOR	1983.0	42
DATATECH SOFTWARE SYSTEMS	VOLUME TUTOR	1983.0	42
DIGIPAC COMPUTER CONSULTING	GRAPHICAL ANALYSIS	1982.0	42
DIGIPAC COMPUTER CONSULTING	MOLECULAR MOTIONS	1982.0	42
DIGIPAC COMPUTER CONSULTING	TITRATOR	1982.0	42
DISCOVERY SOFTWARE INTERNATIONAL	PROJECT SATELLITE	0.0	60
DIVERSIFIED EDUCATIONAL ENTERPRIS	BALANCE	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	CLASSIFY	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	DICROSS	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	DILUTE	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	DNAGEN	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	ENZYME	1983.0	41

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DIVERSIFIED EDUCATIONAL ENTERPRIS	FLYGEN	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	MANRGY	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	MONOCROSS	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	MOTHS	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	NICHE	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	OSMO	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	PLANT	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	POLLUTE	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	POPGEN	1983.0	41
DIVERSIFIED EDUCATIONAL ENTERPRIS	POPGRO	1983.0	41
EARTHWARE COMPUTER SERVICES	STAR SEARCH	0.0	40
EARTHWARE COMPUTER SERVICES	VOLCANOES	1981.0	42
EDUCATIONAL ACTIVITIES	ASTRONOMY STARS FOR ALL SEASONS	0.0	40
EDUCATIONAL ACTIVITIES	BIOCHEMISTRY	0.0	60
EDUCATIONAL ACTIVITIES	CELLS	1982.0	41
EDUCATIONAL ACTIVITIES	CHEMISTRY FORMULAS & NAMES OF INORGANIC COMPOUNDS	0.0	60
EDUCATIONAL ACTIVITIES	CLASSIFICATION OF LIVING THINGS	0.0	40
EDUCATIONAL ACTIVITIES	HEART LAB	0.0	40
EDUCATIONAL ACTIVITIES	INTRO. TO BIOCHEMISTRY	0.0	60
EDUCATIONAL ACTIVITIES	PARTS OF MICROSCOPE	0.0	40
EDUCATIONAL ACTIVITIES	WEATHER	0.0	60
EDUCATIONAL AUDIO VISUAL	WEATHER COMMAND: A SCIENCE GAME	0.0	40
EDUCATIONAL COMPUTING SYSTEMS	ORDERIDENT	1980.0	42
EDUCATIONAL COURSEWARE	ASTRONOMY I-INTRODUCTIONS	1980.0	41
EDUCATIONAL COURSEWARE	ASTRONOMY II-CONSTELLATIONS	1981.0	41
EDUCATIONAL COURSEWARE	FREE FALL	1979.0	41
EDUCATIONAL COURSEWARE	LAB PLOTS	1980.0	41
EDUCATIONAL COURSEWARE	LINEAR MOMENTUM	0.0	60
EDUCATIONAL COURSEWARE	PLANETS	0.0	60
EDUCATIONAL COURSEWARE	POPULATION	1980.0	41
EDUCATIONAL COURSEWARE	WAVE & OPTICS	1979.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	ADVANCED GENETICS	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	AIR POLLUTION	1982.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	CALORIMETRY & THERMODYNAMICS	1983.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	CHEMISTRY 1 SERIES	0.0	40
EDUCATIONAL MATERIALS & EQUIPMENT	COLLISIONS HARMONIC MOTION	1983.0	70
EDUCATIONAL MATERIALS & EQUIPMENT	COMPLEX CIRCUITS	1983.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	CONSERVATION OF ENERGY & MOMENTUM	1984.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	DENSITY RUTHERFORD ATOM	0.0	40
EDUCATIONAL MATERIALS & EQUIPMENT	ELECTRICITY	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	GENETICS & EVOLUTION	1982.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	HOME ENERGY CONSERVATION	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	INTRO. GENETICS	1983.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	MEIOSIS	1984.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	MICROBIOLOGY TECHNIQUES	1983.0	70
EDUCATIONAL MATERIALS & EQUIPMENT	MIRRORS & LENSES	1983.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	NATURAL SELECTION	1982.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	NUCLEIC ACIDS	1982.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	ORGANIC CHEMISTRY SERIES	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	OSMOSIS & DIFFUSION	1982.0	43

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EDUCATIONAL MATERIALS & EQUIPMENT	POPULATION FLUCTUATIONS	1982.0	43
EDUCATIONAL MATERIALS & EQUIPMENT	PROJECTILE & CIRCULAR MOTION	1982.0	70
EDUCATIONAL MATERIALS & EQUIPMENT	SOLAR OPTION	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	STATICS & DYNAMICS	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	VECTORS & SCALARS	1983.0	41
EDUSOFT	FLIGHT VECTOR	1982.0	42
EDUTECH	ADVANCED PHYSICS	1981.0	70
EDUTECH	ANIMATIONS	1984.0	42
EDUTECH	COMPTROL LAB	0.0	60
EDUTECH	DNA	1984.0	42
EDUTECH	ELECTRIC FIELD (PHYSICS COMPULAB)	1981.0	70
EDUTECH	FOURIER ANALYSIS	1981.0	70
EDUTECH	GENE STRUCTURE & FUNCTION	0.0	42
EDUTECH	MECHANICS	1981.0	70
EDUTECH	NON CONSTANT ACCELERATION (PHYSICS COMPULAB)	1981.0	70
EDUTECH	OPTICS	1981.0	42
EDUTECH	PLANETARY MOTION (PHYSICS COMPULAB)	1981.0	70
EDUTECH	PLANETARY ORBITS	1981.0	70
EDUTECH	PROTEIN SYNTHESIS	1984.0	42
EDUTECH	RNA	1984.0	42
EDUTECH	SPACE STATION	1981.0	41
EDUTECH	STATISTICS (PHYSICS COMPULAB)	1981.0	41
EDUTECH	TARGET	1981.0	41
EDUTECH	THREE BODY ORBITS	1981.0	70
EDUTECH	VECTOR	1981.0	70
EDUTECH	WAVE MOTION (PHYSICS COMPULAB)	1981.0	70
ENCYCLOPAEDIA BRITANNICA	BIOLOGY: GENETICS	1984.0	41
ENCYCLOPAEDIA BRITANNICA	CELL	1983.0	41
ENCYCLOPAEDIA BRITANNICA	CHEMISTRY ACIDS & BASES	1983.0	42
ENCYCLOPAEDIA BRITANNICA	ENERGY & LIFE	1983.0	41
ENCYCLOPAEDIA BRITANNICA	HUMAN ANATOMY	1984.0	41
ENTELEK	COMPUTER BASED PHYSICS LAB	0.0	60
ENTELEK	GENETICS WITH COMPUTER	0.0	60
ENTELEK	PHYSICS WITH COMPUTER	0.0	60
FOCUS MEDIA	ASTRONOMY KEYWORD	1984.0	41
FOCUS MEDIA	CHEMISTRY SERIES 1	1983.0	41
FOCUS MEDIA	DISCOVERING THE SCIENTIFIC METHOD	1984.0	41
FOCUS MEDIA	ELECTRICITY & MAGNETISM	1983.0	42
FOCUS MEDIA	ENERGY	1983.0	41
FOCUS MEDIA	ENERGY KEYWORD	1984.0	41
FOCUS MEDIA	HUMAN SYSTEMS KEYWORD	1984.0	41
FOCUS MEDIA	IDENTIFYING MINERALS	1982.0	41
FOCUS MEDIA	INVERTEBRATE BIOLOGY KEYWORD	1984.0	41
FOCUS MEDIA	MATTER & ENERGY	1982.0	41
FOCUS MEDIA	MATTER KEYWORD	1984.0	41
FOCUS MEDIA	NONLINEAR MOTION	1983.0	41
FOCUS MEDIA	PLANT BIOLOGY KEYWORD	1984.0	41
FOCUS MEDIA	ROCKS & MINERALS KEYWORD	1984.0	41
FOCUS MEDIA	VERTEBRATE BIOLOGY KEYWORD	1984.0	41
FOCUS MEDIA	WATER & WEATHER	1983.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
FOCUS MEDIA	YOUR BODY SER. 1	1982.0	41
FOCUS MEDIA	YOUR BODY SER. 2	1983.0	41
HARTMAN	KINETICS	1982.0	41
HEATH	ANIMALS WITH BACKBONES	0.0	60
HEATH	CHANGING EARTH	0.0	60
HEATH	ELECTRICITY & MAGNETISM	0.0	60
HEATH	HEAT ENERGY	0.0	60
HEATH	INSECT WORLD	0.0	60
HEATH	LIFE IN THE OCEAN	0.0	60
HEATH	MACHINES & FORCE	0.0	60
HEATH	SOLAR SYSTEM	0.0	60
HEINEMANN COMPUTERS IN EDUCATION	CLIMATE	1982.0	42
HEINEMANN COMPUTERS IN EDUCATION	LONGITUDINAL WAVES	1982.0	42
HEINEMANN COMPUTERS IN EDUCATION	PHYSIOLOGICAL SIMULATION	1982.0	42
HEINEMANN COMPUTERS IN EDUCATION	SCALES	1982.0	41
HEINEMANN COMPUTERS IN EDUCATION	SYMBOLS TO MOLES	1982.0	41
HEINEMANN COMPUTERS IN EDUCATION	WEATHER	1982.0	42
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 1	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 2	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 3	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 4	0.0	60
HOLT RINEHART & WINSTON	HONEY FACTORY	0.0	50
HOWELL	BONES GAME	0.0	41
HRM SOFTWARE	ELECTRIC BILL	1983.0	41
HRM SOFTWARE	GENE MACHINE	1983.0	41
HRM SOFTWARE	HEREDITY DOG	1983.0	41
HRM SOFTWARE	HOME ENERGY SAVINGS	1983.0	41
HRM SOFTWARE	PERSONAL ENERGY INVENTORY	0.0	40
HRM SOFTWARE	POWER GRID	1983.0	41
IDEAL SCHOOL SUPPLY	STRUCTURE OF LEAVES	0.0	60
IDEATECH	BASIC ELECTRICITY	0.0	60
INDIAN HEAD SOFTWARE	CHEMICAL SYMBOLS	0.0	60
INDIAN HEAD SOFTWARE	VECTOR SUM	0.0	60
INFORMATICS SOFTWARE	FORCE & ENERGY	0.0	60
INTELLECTUAL SOFTWARE	AUSTRALIAN, AFRICAN & ASIAN ANIMALS	0.0	40
INTELLECTUAL SOFTWARE	BIOLOGY 1	1983.0	41
INTELLECTUAL SOFTWARE	BIOLOGY 2	0.0	40
INTELLECTUAL SOFTWARE	BIRDS	0.0	40
INTELLECTUAL SOFTWARE	DINOSAURS	1983.0	41
INTELLECTUAL SOFTWARE	EARTHQUAKES & VOLCANOS	0.0	40
INTELLECTUAL SOFTWARE	ELECTRICITY	0.0	40
INTELLECTUAL SOFTWARE	ELEMENTARY CHEMISTRY	0.0	40
INTELLECTUAL SOFTWARE	ELEMENTARY PHYSICS	0.0	40
INTELLECTUAL SOFTWARE	FARM ANIMALS	0.0	40
INTELLECTUAL SOFTWARE	GENERAL CHEMISTRY 1	0.0	40
INTELLECTUAL SOFTWARE	GENERAL CHEMISTRY 2	0.0	40
INTELLECTUAL SOFTWARE	HABITS - DESERT, MEADOW, FIELD, FOREST, MOUNTAIN	0.0	40
INTELLECTUAL SOFTWARE	INTRO. TO ARCHEOLOGY	0.0	40
INTELLECTUAL SOFTWARE	INVENTORS & INVENTIONS	0.0	40
INTELLECTUAL SOFTWARE	MONKEYS, APES & GORILLAS	0.0	40

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INTELLECTUAL SOFTWARE	NORTH AMERICAN ANIMALS	0.0	40
INTELLECTUAL SOFTWARE	OCEAN MAMMALS	0.0	40
INTELLECTUAL SOFTWARE	ORGANIC CHEMISTRY 1	0.0	40
INTELLECTUAL SOFTWARE	ORGANIC CHEMISTRY 2	0.0	40
INTELLECTUAL SOFTWARE	PHYSICS 1	0.0	40
INTELLECTUAL SOFTWARE	PHYSICS 2	0.0	40
INTELLECTUAL SOFTWARE	PRACTICAL VOCABULARY	0.0	40
INTELLECTUAL SOFTWARE	REVIEW QUESTIONS IN CHEMISTRY	1983.0	41
INTELLECTUAL SOFTWARE	ROCKETS & SATELLITES	0.0	40
INTELLECTUAL SOFTWARE	ROCKS & MINERALS	0.0	40
INTELLECTUAL SOFTWARE	RODENTS	0.0	40
INTELLECTUAL SOFTWARE	SHARKS & WHALES	0.0	40
INTELLECTUAL SOFTWARE	SNAKES & REPTILES	0.0	40
INTELLECTUAL SOFTWARE	STARS & PLANETS	0.0	40
INTELLECTUAL SOFTWARE	THE EARTH'S MOVEMENT	0.0	40
INTELLECTUAL SOFTWARE	THE ICE AGE & GLACIERS	0.0	40
INTELLECTUAL SOFTWARE	THE WEATHER	0.0	40
INTELLECTUAL SOFTWARE	VOCAB. ADVENTURE 2	0.0	40
INTELLECTUAL SOFTWARE	VOCAB. ADVENTURE 3	0.0	40
INTELLECTUAL SOFTWARE	VOCAB. ADVENTURE 4	0.0	40
INTELLECTUAL SOFTWARE	VOCAB. ADVENTURE 5	0.0	40
INTERLEARN	CHEMISTRY ADVENTURE	1983.0	41
J&S SOFTWARE	ACCELERATION	0.0	40
J&S SOFTWARE	ACID BASE PROBLEMS	0.0	40
J&S SOFTWARE	ACID BASE THEORIES	0.0	40
J&S SOFTWARE	ACIDS & BASES	0.0	40
J&S SOFTWARE	ANIMAL REPRODUCTION	1981.0	41
J&S SOFTWARE	ASEXUAL REPRODUCTION	1981.0	41
J&S SOFTWARE	ATOMS	0.0	40
J&S SOFTWARE	BIOCHEMISTRY	1981.0	41
J&S SOFTWARE	BONDING	0.0	40
J&S SOFTWARE	BONDING BETWEEN MOLECULES	0.0	40
J&S SOFTWARE	BONDING IN MOLECULES	0.0	40
J&S SOFTWARE	CARBON CHEMISTRY	0.0	40
J&S SOFTWARE	CELLS	1981.0	41
J&S SOFTWARE	CHEMICAL EQUATIONS	0.0	40
J&S SOFTWARE	CIRCULAR MOTION	0.0	40
J&S SOFTWARE	CLASSIFICATION	1981.0	41
J&S SOFTWARE	DIGESTION	1981.0	41
J&S SOFTWARE	ELECTRICITY	0.0	40
J&S SOFTWARE	ELECTROCHEMICAL CELLS	0.0	40
J&S SOFTWARE	ELECTRON STRUCTURE	0.0	40
J&S SOFTWARE	ENDOCRINE SYSTEM	1981.0	41
J&S SOFTWARE	ENERGY	0.0	40
J&S SOFTWARE	EQUILIBRIUM	0.0	40
J&S SOFTWARE	EXCRETION	1981.0	41
J&S SOFTWARE	FAMILIES OF ATOMS	0.0	40
J&S SOFTWARE	FREE FALL	0.0	40
J&S SOFTWARE	GAS RELATIONSHIPS	0.0	40
J&S SOFTWARE	GENETICS	1981.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
J&S SOFTWARE	HEARTBEAT/HEARTWORK/HEARTFLOW	0.0	40
J&S SOFTWARE	KINETICS	0.0	40
J&S SOFTWARE	LIGHT	0.0	40
J&S SOFTWARE	LOCOMOTION	1981.0	41
J&S SOFTWARE	MAGNETISM	0.0	40
J&S SOFTWARE	MATTER	0.0	40
J&S SOFTWARE	MOLES & FORMULAS	0.0	40
J&S SOFTWARE	MOMENTUM	0.0	40
J&S SOFTWARE	MOTION	0.0	40
J&S SOFTWARE	NERVOUS SYSTEM	1981.0	41
J&S SOFTWARE	NEWTON'S LAWS	0.0	40
J&S SOFTWARE	ORGANIC CHEMISTRY	0.0	40
J&S SOFTWARE	OXIDATION REDUCTION	0.0	40
J&S SOFTWARE	PERIODIC TABLE	0.0	40
J&S SOFTWARE	PHOTOSYNTHESIS & TRANSPORT	1981.0	41
J&S SOFTWARE	PHYSICAL SCIENCE BASEBALL	0.0	40
J&S SOFTWARE	PROJECTILE PROBLEMS	0.0	40
J&S SOFTWARE	RADIOACTIVITY	0.0	40
J&S SOFTWARE	REACTIONS	0.0	40
J&S SOFTWARE	REPRODUCTION PLANTS	1981.0	41
J&S SOFTWARE	RESPIRATION	1981.0	41
J&S SOFTWARE	SOLUTIONS	0.0	40
J&S SOFTWARE	SOUND	0.0	40
J&S SOFTWARE	TRANSPORT	1981.0	41
J&S SOFTWARE	UNIFORM MOTION	0.0	40
J&S SOFTWARE	WORK & ENERGY	0.0	40
KRELL SOFTWARE	ADVENTURES IN FLESH	1983.0	60
KRELL SOFTWARE	CONNECTIONS	0.0	40
KRELL SOFTWARE	ISAAC NEWTON & F. G.NEWTON	1981.0	70
LEARNING WELL	BODY AWARENESS	1983.0	41
LITTLE SHAVER SOFTWARE	CIRCULATION	1983.0	40
LITTLE SHAVER SOFTWARE	DIGESTION	1983.0	40
LITTLE SHAVER SOFTWARE	MUSCLES	1983.0	40
LITTLE SHAVER SOFTWARE	OUR SOLAR SYSTEM	1983.0	41
LITTLE SHAVER SOFTWARE	OUR WEATHER	1983.0	41
LITTLE SHAVER SOFTWARE	RESPIRATION	1983.0	40
LITTLE SHAVER SOFTWARE	SYSTEMS OF THE HUMANBODY	1983.0	40
LITTLE SHAVER SOFTWARE	THE BONES	1983.0	41
LITTLE SHAVER SOFTWARE	THE SKIN	1983.0	40
LONGMAN GROUP	CHEMICAL ELEMENT GAME	0.0	40
LONGMAN GROUP	POND ECOLOGY	0.0	40
LONGMAN GROUP	SCALES	0.0	40
MANITOBA COMPUTER ASSISTED LEARN.	DISK D1	0.0	60
MCGRAW HILL RYERSON	ENERGY SEARCH	1982.0	42
MCGRAW HILL RYERSON	GEOLOGY SEARCH	1982.0	41
MEREDITH, DON	PHEASANT MANAGER	1985.0	41
MERLAN SCIENTIFIC	CHEMICAL NOMENCLATURE	1982.0	42
MERLAN SCIENTIFIC	GAS LAWS & KINETIC MOLECULAR THEORY	1982.0	41
MERLAN SCIENTIFIC	MENDELIAN GENETICS	1982.0	42
MICRO ED	OIL RIG	1982.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
MICRO LEARN	THINK LIKE A SCIENTIST	0.0	40
MICRO POWER & LIGHT	CIRCULATION ORGANS	1980.0	41
MICRO POWER & LIGHT	CIRCULATION SYSTEM	1980.0	41
MICRO POWER & LIGHT	EAR	1982.0	41
MICRO POWER & LIGHT	REPRODUCTION ORGANS	1980.0	41
MICRO POWER & LIGHT	REPRODUCTION PROCESS	1980.0	41
MICRO POWER & LIGHT	SCIENTIFIC MEASUREMENTS	1980.0	42
MICRO POWER & LIGHT	SCIENTIFIC METHOD	0.0	40
MICRO POWER & LIGHT	SIMPLE MACHINES	1980.0	41
MICROCOMPUTER WORKSHOPS	GENETICS	1983.0	42
MICROCOMPUTERS IN EDUCATION	LIGHTBULBS	1981.0	41
MICROPHYS PROGRAMS	CHEMISTRY 1	0.0	60
MICROPHYS PROGRAMS	CHEMISTRY 2	0.0	60
MICROPHYS PROGRAMS	PHYSICS 1	0.0	60
MICROPHYS PROGRAMS	PHYSICS 2	0.0	60
MICROPI	NOTAT	0.0	60
MICROPI	QUAL	0.0	60
MUSE SOFTWARE	THREE MILE ISLAND	0.0	40
ORANGE CHERRY MEDIA	WEATHER SCIENCE SET	0.0	60
ORANGE JUICE SOFTWARE	WHAT'S A MATTER	1982.0	41
ORANGE JUICE SOFTWARE	WHAT'S IN THERE	1984.0	41
ORANGE JUICE SOFTWARE	WHAT'S IT ALL ABOUT MACHY	1984.0	41
ORANGE JUICE SOFTWARE	WHAT'S UP THERE	1982.0	41
ORANGE JUICE SOFTWARE	WHO WERE THOSE GUYS	1982.0	41
PEACHTREE SOFTWARE (EDUWARE)	RENDEZVOUS	1982.0	70
PHILADELPHIA SCHOOL DISTRICT	ATOM	0.0	60
PHILADELPHIA SCHOOL DISTRICT	CELLM	0.0	60
PHILADELPHIA SCHOOL DISTRICT	CLOUDS	0.0	60
PHILADELPHIA SCHOOL DISTRICT	ELMENT	0.0	60
PHILADELPHIA SCHOOL DISTRICT	EVOLV	0.0	60
PHILADELPHIA SCHOOL DISTRICT	MOLAR	0.0	60
PHILADELPHIA SCHOOL DISTRICT	PERIOD	0.0	60
PHILADELPHIA SCHOOL DISTRICT	SLITS	0.0	60
PHILADELPHIA SCHOOL DISTRICT	SMELL	0.0	60
PHILADELPHIA SCHOOL DISTRICT	SPACE	0.0	60
PROGRAMMA INTERNATIONAL	PLANETS	0.0	40
PROGRAMMA INTERNATIONAL	SIRIUS	0.0	60
PROGRAMS FOR LEARNING	ACID BASE CHEMISTRY	1982.0	42
PROGRAMS FOR LEARNING	ATOMIC STRUCTURE	1982.0	41
PROGRAMS FOR LEARNING	CHEMICAL EQUILIBRIUM	1982.0	41
PROGRAMS FOR LEARNING	CHEMISTRY WITH A COMPUTER	1982.0	42
PROGRAMS FOR LEARNING	ORGANIC NOMENCLATURE	1981.0	41
PROGRAMS FOR LEARNING	SPECTRO PH METER WHEATSTONE BRIDGE	1982.0	41
RIGHT ON PROGRAMS	BIRDS	1983.0	41
RIGHT ON PROGRAMS	COMMUNICATIONS	1983.0	41
RIGHT ON PROGRAMS	EARTH	1983.0	41
RIGHT ON PROGRAMS	ELECTRICITY	1983.0	41
RIGHT ON PROGRAMS	ENERGY AT WORK	1983.0	41
RIGHT ON PROGRAMS	GOOD HEALTH HABITS	1983.0	41
RIGHT ON PROGRAMS	HEALTH & OUR BODIES	1983.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
RIGHT ON PROGRAMS	INSECTS	1983.0	41
RIGHT ON PROGRAMS	LIFE IN OCEANS	1983.0	41
RIGHT ON PROGRAMS	LIGHT	1983.0	41
RIGHT ON PROGRAMS	LIVING THINGS	1983.0	41
RIGHT ON PROGRAMS	MAMMALS	1983.0	41
RIGHT ON PROGRAMS	MATTER	1983.0	41
RIGHT ON PROGRAMS	MATTER & ENERGY	1983.0	41
RIGHT ON PROGRAMS	OUR BODIES	1983.0	41
RIGHT ON PROGRAMS	PLANTS	1983.0	41
RIGHT ON PROGRAMS	SOLAR SYSTEM	1983.0	41
RIGHT ON PROGRAMS	SOUND	1983.0	41
SCHOOL & HOME COURSEWARE	D = RT	0.0	60
SCHOOL & HOME COURSEWARE	INFERRING CONNECTIONS	0.0	60
SCHOOL & HOME COURSEWARE	SCIENTIFIC NOTATION	0.0	60
SCHOOLHOUSE SOFTWARE	BUG CAGE	0.0	40
SCHOOLHOUSE SOFTWARE	HOT SHOT	1982.0	41
SCHOOLHOUSE SOFTWARE	LAUNCH PAD	0.0	40
SCHOOLHOUSE SOFTWARE	LIGHTNING BOLTS	0.0	40
SCHOOLHOUSE SOFTWARE	MAD SCIENTIST	0.0	40
SCHOOLHOUSE SOFTWARE	SUPER TOE (DIVISION)	0.0	40
SIMULATION SOFTWARE	THE DOCTOR GAME	1982.0	41
SIMULATION SOFTWARE	YOU'RE THE DOC/ELEM. LEVEL	0.0	40
SOLARTEK	SUNGRAPH	0.0	60
SOLARTEK	SUNHEAT 1	0.0	60
SOLARTEK	SUNMAI	0.0	60
SOLARTEK	SUNSIM 2	0.0	60
SOLARTEK	SUNSIM 3	0.0	60
SOLARTEK	SUNSIM 4	0.0	60
SPECTRUM SOFTWARE	METRICS	1983.0	41
SPECTRUM SOFTWARE	ROCKS	1984.0	41
SPECTRUM SOFTWARE	TEETH	1984.0	41
SPECTRUM SOFTWARE	TRACKS	0.0	60
STATE UNIV. OF N. Y (STONY BROOK)	HUNTINGTON 3	1982.0	42
SUBLOGIC COMMUNICATIONS	SATURN NAVIGATOR	1982.0	70
SYNERGISTIC SOFTWARE	ANATOMICAL ADVENTURE	0.0	60
SYNERGISTIC SOFTWARE	MICROBE	0.0	60
SYNERGISTIC SOFTWARE	PLANETARY GUIDE	0.0	40
SYNERGISTIC SOFTWARE	STAR GAZER'S GUIDE	0.0	60
TAMARACK SOFTWARE	CHEMISTRY PROGRAMS	0.0	50
TAYLOR	UNDERSTANDING CHEMICAL FORMULAS	1983.0	41
TEACH YOURSELF BY COMPUTER	CELL DIVISION/GENETICS	1979.0	41
TEACH YOURSELF BY COMPUTER	DIGESTION/CIRCULATION	1979.0	41
TEACH YOURSELF BY COMPUTER	PLANTS/ECOLOGY	1979.0	41
TEACH YOURSELF BY COMPUTER	REPRODUCTION/MUSCLE & BONES	1979.0	41
TEACH YOURSELF BY COMPUTER	RESPIRATION & EXCRETION/NERVOUS & ENDOCRINE SYSTEM	1979.0	41
TEACH YOURSELF BY COMPUTER	WEATHER FRONTS	1981.0	42
THE PROFESSOR	ATOMIC PHYSICS	1983.0	41
THE PROFESSOR	CIRCULAR MOTION	1983.0	41
THE PROFESSOR	CONSERVATION LAWS	1983.0	41
THE PROFESSOR	ELECTRICITY & MAGNETISM	1983.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
THE PROFESSOR	STATICS	1983.0	41
THE PROFESSOR	STELLAR ASTRONOMY	1983.0	41
THE PROFESSOR	THERMODYNAMICS	1983.0	41
TIES	ENERGY HOUSE	0.0	40
VENTURA EDUCATIONAL SYSTEMS	CHEMAID	0.0	40
VENTURA EDUCATIONAL SYSTEMS	PROTOZOA	1984.0	41
VENTURA EDUCATIONAL SYSTEMS	SENSES	1983.0	41
VENTURA EDUCATIONAL SYSTEMS	THE WORM	0.0	40
VENTURA EDUCATIONAL SYSTEMS	VISIFROG	1985.0	41
VERNIER SOFTWARE	CHARGED PARTICLES II	0.0	40
VERNIER SOFTWARE	GRAPHICAL ANALYSIS II	1983.0	42
VERNIER SOFTWARE	KINEMATICS II	1983.0	42
VERNIER SOFTWARE	ORBIT	1982.0	41
VERNIER SOFTWARE	PROJECTILES II	1983.0	42
VERNIER SOFTWARE	VECTOR ADDITION II	1983.0	42
VERSA COMPUTING	ANATOMY 1	0.0	40
VISUAL MATERIALS	SOLVING MYSTERIES OF LIGHT	0.0	60
WILEY (JOHN) & SONS	BIOLOGICAL CHEMISTRY (CON. CHEM. CONCEPTS III)	1983.0	70
WILEY (JOHN) & SONS	COMPUTER AIDED INSTRUCTION FOR GENERAL CHEMISTRY	1982.0	41
WILEY (JOHN) & SONS	CONCENTRATED CHEMICAL CONCEPTS (3 PART SERIES)	1983.0	42
WILEY (JOHN) & SONS	GENERAL CHEMISTRY (CON. CHEM. CONCEPTS I)	1983.0	42
WILEY (JOHN) & SONS	ORGANIC & BIOLOGICAL CHEMISTRY (PRELAB STUDIES II)	1983.0	41
WILEY (JOHN) & SONS	ORGANIC CHEMISTRY (CON. CHEM. CONCEPTS II)	1983.0	70
YAKER ENVIRONMENTAL SYSTEMS	BIOMES & FOOD WEBS	0.0	40
YAKER ENVIRONMENTAL SYSTEMS	LIMITING FACTORS & CARRYING CAPACITY	0.0	40

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SPECIAL EDUCATION INDEX

AUTHORIZED

TITLE	PUBLISHER	STATUS (REGULAR CLASSES)	PAGE
Mathematics: Levels A, B and C	Science Research Associates	Recommended (1 - 6)	SpEd 3
Math Sequences	Milliken Publishing Company	Recommended (1 - 8)	SpEd 5

LIST OF TITLES WE ARE UNABLE TO RECOMMEND

SpEd 7

MATHEMATICS: LEVEL A (Managed)
MATHEMATICS: LEVEL B (Managed)
MATHEMATICS: LEVEL C (Managed)

APPLICABILITY TO SPECIAL EDUCATION STUDENTS

SRA's "Mathematics Levels A, B and C" were evaluated by teachers of special education students (primarily mentally handicapped students) to determine if they could be used with this target audience. Their observations are summarized below. As this product has been described elsewhere in this report, only evaluative comments are shown here. Readers are reminded that this package was recommended for regular classes and the report in the mathematics section should be read in conjunction with this one.

PEDAGOGICAL CONTENT EVALUATION

The content range and sequence appear appropriate for special education target audiences with the possible exception of TMH students. With some students, use of the series may be limited to whole number addition, subtraction and multiplication functions.

The depth of instruction is inadequate for almost all students. It should be noted that the series was designed as a drill and practice program; however, for these target audiences, much teacher instruction and interaction would still appear to be necessary. Also, in addition to the lack of instruction, many of the directions are sketchy and students can quickly become confused and/or frustrated. The students would have to be very familiar with the series before they could easily operate it on an independent basis.

In some algorithms, the program moves the cursor to its next location. For example, in multiplication questions, the cursor is automatically placed in the correct location for each multiplication step. For many students, one of the most important aspects of using the algorithm is knowing the next point of focus

For emotionally disturbed students, the segmentation of the content into sufficiently small units allows visible progress and motivation through success.

INSTRUCTIONAL FORMAT EVALUATION

The degree of student interaction is a good feature. It helps to maintain attention to the task and interest in what is going on in the program by providing the student with control over the flow of the lesson.

Some of the feedback is adequate for these students. The boxes at the bottom were a motivational factor. However, some difficulty occurred with the quantitative results and the recommendation at the end of the drill. Students could not judge "how much harder" or "how much easier" their next lesson should be. Teacher involvement would be very necessary at this time. Perhaps a more specific instruction such as "you must go back to lesson two", would be better. Also, older students may not view the "happy face" positively.

If a student continues to err, the step by step solution to the problem tends to be inadequate for most target groups. The reading level will likely be too high and much instructor time will be required to work through these sections with the student. Also, the program's inability to accept renaming in the help mode may require the student to use paper and pencil to work the problem through.

The availability of a pre-test is an advantage.

TECHNICAL CHARACTERISTICS EVALUATION

Well designed page layouts and good letter size contribute to the technical quality. The general readability level is appropriate and requires minimal teacher assistance (except as noted earlier).

Within the low level lessons for addition and subtraction, the flashing boxes moving across the screen were often a distraction. Another consideration is the fact that the flashing boxes on the screen may be enough to trigger seizure activity in an epileptic individual.

The package could be used by physically handicapped students since only single keystrokes are required and a minimum of accidental keystrokes is possible. The fact that the "help" command is performed with two keys is not overly difficult since the keys are adjacent.

As there is no significant audio component involved in the programs, the use by hearing impaired students would not be precluded.

The large character set allows individuals with a perceptual-visual problem to interact with these programs.

SUMMATION

The overall package would be useful to the target audiences as a resource to supplement classroom instruction. Its main function would be one of providing additional practice rather than instruction. It could not be used for stand-alone instruction without major modifications.

The cost of the package, however, may outweigh its utility.

STATUS

"Mathematics Levels A, B and C" have been designated as **RECOMMENDED** learning resources for regular classes.

PURCHASE INFORMATION

See the report on this product in the Math section.

MATH SEQUENCES

APPLICABILITY TO SPECIAL EDUCATION STUDENTS

Milliken's "Math Sequences" were evaluated by teachers of special education students (primarily mentally handicapped students) to determine if they could be used with this target audience. Their observations are summarized below. As this product has been described elsewhere in this report, only evaluative comments are shown here. Readers are reminded that this package was recommended for regular classes and the report in the mathematics section should be read in conjunction with this one.

PEDAGOGICAL CONTENT EVALUATION

For learning disabled students, the more advanced skills are not generally used.

The diskettes on number readiness, addition and subtraction contain items that are appropriate for E.M.H. curriculum levels 1-4. At level 3, decimals, fractions, multiplication and division may be added. At level 4, percents and equations may be applicable. The other sequences are not covered enough in the curriculum to warrant purchase. For the above mentioned diskettes, content range and content sequence are good except for the lack of semi-abstract items.

The number readiness diskette is appropriate for the T.M.H. level. Because of the concreteness of most of the curriculum, the lack of semi-abstract work in this package makes it appropriate for only the top students in the T.M.H. classroom. For these students, the number readiness, addition and subtraction sequences are appropriate.

For emotionally disturbed students the segmentation of the content into sufficiently small units allows visible progress and motivation through success.

Generally, the content range and sequence are appropriate for the target audiences. The linear sequence is well designed in small, logical and progressive units. The depth of the programs, however, is inadequate for most students as no instruction in the skills is provided. It should be noted that the series was designed as a drill and practice program. However, for these target audiences, much teacher instruction and interaction would still appear to be necessary. Also, in addition to the lack of instruction, many of the directions are sketchy and students can quickly become confused and/or frustrated. The students would have to be very familiar with the series before they could easily operate it on an independent basis.

INSTRUCTIONAL FORMAT EVALUATION

The active involvement of the student during the initial presention of the question is a strength; however, the student is not involved in the remediation, which is especially necessary for these target audiences. The feedback for incorrect answers relies on the student being willing and able to study the correct solution and make the necessary adjustments. Close teacher interaction will be needed to make this effective.

Since pre-tests and post-tests are not included, the onus is on the teacher to assess the appropriate problem level of the individual student. The management system allows the teacher to specify the number of questions, mastery levels and failure levels in order to tailor programs to meet individual needs.

As many students in these target groups require a visual stimulus to determine if an entry is an appropriate choice, they might become frustrated by not having the opportunity to correct a wrong input once it is put into the computer. Another input, such as "press return", should be required after the user has determined if that is the correct answer that (s)he wants to enter.

The coding of the quantitative feedback displayed at the bottom of the screen is confusing.

TECHNICAL CHARACTERISTICS EVALUATION

The graphical feedback may be age-inappropriate. Some evaluators found the graphical reinforcements to be excellent. Others found that initial pleasure turned into frustration as the reinforcements were repetitive and slow in their presentation and erasure.

Answers are not always entered from right to left. Although what was done was technically correct, the program for the most part sets up an expectation of right to left progression.

Eye movement is not always sequential (from left to right, top to bottom) or consistent between programs. Total scanning of the screen by the student is therefore required in order to detect new information that has been presented.

With the exception of the unit on measurement, numbers and symbols are appropriately sized. The large character set enables individuals with a perceptual-visual problem to interact with these programs.

The use of the flashing signal to press return (and the red "X" on old versions) may be enough to trigger seizure activity in an epileptic individual.

Vocabulary and reading levels are appropriate for specified population groups; however, the general readability is poor. Special education students generally require assistance in focussing attention and in consistent tracking through multiple step problems and all attempts should be made to ensure ease of progression through problem solutions. All extraneous information which serves to distract the student should be eliminated. Feedback statements and remedial presentations should be positioned at consistent locations on the screen and entry direction of questions and responses should follow a consistent format.

The package could be used by physically handicapped students; however, the degree of severity of the individual student's physical handicap would have to be evaluated in terms of the user's ability to enter responses on the regular keyboard.

As there is no audio component involved in the programs, the use by hearing impaired students would not be precluded.

SUMMATION

These programs are not a teaching tool to replace the essential concrete manipulative aids. Rather, they could be used when concepts are thoroughly understood and when users need only practice. Notwithstanding the critical comments noted earlier, in terms of pedagogical content, instructional format and technical characteristics, the Milliken Math Sequences are definitely appropriate and should be strongly considered for use with special education students.

STATUS

The package "Math Sequences" has been designated as a RECOMMENDED learning resource for regular classes.

PURCHASE INFORMATION

See the report on this product in the Math section.

SPECIAL EDUCATION TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
AQUARIUS	AGE OF RESPONSIBILITY	1981.0	41
AQUARIUS	ALL ABOUT INTEREST	1982.0	41
AQUARIUS	CONSUMER FRAUD	1982.0	41
AQUARIUS	CONSUMER HELP	1982.0	41
AQUARIUS	CONSUMERISM & YOU	1982.0	41
AQUARIUS	CREDIT	1982.0	41
AQUARIUS	DECISION MAKING	1981.0	41
AQUARIUS	EATING FOR GOOD HEALTH	1982.0	41
AQUARIUS	FRIENDS & YOU	1981.0	41
AQUARIUS	HOW TO FINANCE A CAR	1982.0	41
AQUARIUS	HOW TO GET & HOLD A JOB	1982.0	41
AQUARIUS	INTERVIEWING	1982.0	41
AQUARIUS	LAW	1981.0	41
AQUARIUS	LAWS FOR CONSUMERS	1982.0	41
AQUARIUS	MAP READING	1981.0	41
AQUARIUS	METRICS & YOU	1982.0	41
AQUARIUS	NEW ON THE JOB	1982.0	41
AQUARIUS	PART TIME JOBS	1982.0	41
AQUARIUS	READING AN ADVERTISEMENT	1982.0	41
AQUARIUS	SELF CONCEPT & YOUR WORK	1982.0	41
AQUARIUS	SHOPPING IN A COMPARATIVE WAY	1982.0	41
AQUARIUS	SUCCEEDING	1981.0	41
AQUARIUS	THE JOB & YOU	1982.0	41
AQUARIUS	TIPS ON BUYING A USED CAR	1982.0	41
AQUARIUS	UNDERSTANDING LABELS	1982.0	41
AQUARIUS	YOU & INSURANCE	1982.0	41
ASHTON	WORDWARE REMEDIAL PROGRAMS	1982.0	41
CEEDE	PART 1 FILLING IT OUT UNIT IV	0.0	60
CEEDE	PART 2 FILLING IT OUT UNIT IV	0.0	60
ENCYCLOPAEDIA BRITANNICA	BANKING & CREDIT	1984.0	41
ENCYCLOPAEDIA BRITANNICA	JOB APPLICATIONS & PAYCHECKS	1984.0	41
HAPPY APPLE SOFTWARE	MAGIC BLACKBOARD	1981.0	41
LEARNING WELL	SMART SHOPPER/FACT OR OPINION	1982.0	41
MCE	HOME SAFE HOME	1982.0	41
MCE	INCOME MEETS EXPENSES	1982.0	41
MCE	JOB READINESS	1982.0	41
MCE	POISON PROOF YOUR HOME	1982.0	41
MCE	YOU CAN BANK ON IT	1982.0	41
MEP REGIONAL CENTRE	LETTERS	1983.0	41
MEP REGIONAL CENTRE	NUMBERS	1983.0	41
NEATH HILL PROFESSIONAL WORKSHOP	ACE APPLE 2 DEMONSTRATION DISK	1982.0	41
PEACHTREE SOFTWARE (EDUWARE)	COUNTING BEE	1.1	50
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